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an ecoACTION initiative

# 10

COMPANIES THAT ARE  
*MAKING A DIFFERENCE*

CIPEC Leadership Award Winners

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Canadian Industry Program  
for Energy Conservation

Canada



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The digital mosaic of Canada that appears on the  
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of vegetation cover: bright green for dense vegetation  
in the humid southern regions; yellow for semi-arid  
and mountainous regions; brown for the Far North,  
where vegetation cover is very sparse; and white for  
the Arctic regions.

## Table of Contents

1	About CIPEC	56	An Overview of CIPEC Data Gathering
2	Message From the Chair – Moving Forward on Energy Efficiency	58	Aluminum
5	The Results	59	Brewery
		60	Cement
6	<b>10 Companies That Are Making a Difference</b>	61	Chemical
8	New Tool Cuts Energy Costs	62	Construction
12	Conservation Culture Builds Competitive Edge	63	Dairy
16	Energy Management Is All About People	64	Electrical and Electronics
20	The System Is the Thing	65	Electricity Generation
24	Going Green From Top to Bottom	66	Fertilizer
28	Molson Brews Energy Savings in Its Montréal Facility	67	Food and Beverage
32	Practical Thinking Leads to a New Energy Model	68	Foundry
36	A Motivated Work Force Solidifies Savings	69	General Manufacturing
40	Cost Reduction Mandate Drives a Company-wide Transformation	70	Lime
44	Cutting Edge Technology Changes the Energy Paradigm	71	Mining
		72	Oil Sands
48	<b>Putting Ideas Into Action</b>	73	Petroleum Products
49	ecoENERGY	74	Plastics
50	Sector Task Forces	75	Pulp and Paper
51	CIPEC Leaders	76	Rubber
52	Dollars to Sense Workshops	77	Steel
54	Benchmarking Studies	78	Textiles
55	<b>Heads Up CIPEC Publications</b>	79	Transportation Equipment Manufacturing
		80	Upstream Oil and Gas
		81	Wood Products
		82	CIPEC Executive Board
		83	CIPEC Task Force Council
		85	CIPEC Leader Companies by Sector
		95	CIPEC Trade Associations
		96	Industrial Programs Division Staff
		97	Glossary of Terms





# About **CIPEC**

## **The Canadian Industry Program for Energy Conservation (CIPEC)**

is an umbrella organization overseeing a partnership between government and private industry aimed at improving Canada's industrial energy efficiency. CIPEC comprises sectoral task forces, each representing companies that are engaged in similar industrial activities and participate through their trade associations. The Task Force Council, with representatives from each CIPEC sector, provides a common forum for sectors to share ideas and recommends ways to address common needs. Overall direction is provided by an Executive Board, which is made up of private sector leaders who are champions of industrial energy efficiency within their sectors and who provide advice on industrial energy efficiency programs and related issues to the Government of Canada.

In the CIPEC partnership, change emerges from consensus and joint action built through open and honest communication. CIPEC continues to be the focal point for industry's response to Canada's climate change efforts. Our role is to promote the evolution of energy efficiency and to recognize and reward those who lead the way.

We carry out this mandate in part through a strong communications and awareness program anchored in our twice monthly *Heads Up CIPEC* newsletter, which is sent out to more than 10 000 subscribers.

CIPEC also raises awareness of the goals and benefits of improved energy use in other ways. The Task Force Council and individual sectors are constantly at work to broaden participation, encourage information sharing and bolster awareness of the role and achievements of CIPEC industries.

CIPEC volunteers include successful business leaders and others recognized on the national stage. The profile of these leaders and their strong belief in CIPEC's principles give us a strong edge in attracting new industry participants and in continuing the successful partnership between industry and government.

## **Our Mission**

To promote effective voluntary action that reduces industrial energy use per unit of production, thereby improving economic performance while participating in meeting Canada's climate change objectives.

*The award winners featured in this report exhibit the vision and the accomplishments that symbolize CIPEC's mission.*

**Glenn Mifflin**

Vice-president, North Atlantic Refining Limited  
Chair, CIPEC Executive Board



## Moving Forward on *Energy Efficiency*

**This is my first annual letter to the CIPEC community** as Chair of the Executive Board. I accepted this responsibility because of the importance of energy efficiency to the competitiveness of Canada's industrial sector and the pivotal role it will play as we pursue sustainable growth for our economy.

Doug Speers, our past Chair, led CIPEC's efforts to attract small and medium-sized enterprises into the fold, dramatically increasing our impact in that important component of the industrial landscape.

Doug also worked hard to position CIPEC as industry's principal voice for energy efficiency and earn us a place at the table as Canada lays the groundwork for its energy future. The effectiveness of these efforts was apparent in the federal government's ecoACTION initiative: many of the ecoENERGY for Industry programs in that initiative reflected CIPEC input and counsel.

### The Year in Review

Thanks to strong leadership, the dedicated efforts of both the Executive Board and the Task Force Council, and excellent support from the Office of Energy Efficiency, companies under the CIPEC umbrella continued to make advances in energy efficiency during the past year.

These advances are reflected in a number of statistics:

- 70 companies signed contribution agreements with the Industrial Programs Division under the ecoENERGY Retrofit program and saved an estimated 270 000 gigajoules of energy.
- 156 organizations signed on as CIPEC Leaders, more than three times the target of 50 companies.
- 1061 people registered for the Boiler Efficiency Calculator, a 90 percent increase from last year.
- Dollars to \$ense Workshop industry participation reached 1230, exceeding the target of 1125.
- Attendance at CIPEC's biennial conference, Energy 2007, was an all-time high.
- CIPEC total estimated energy savings exceeded 3.8 petajoules.
- CIPEC estimated greenhouse gas (GHG) emissions reductions totalled 375 kilotonnes (kt).



Going forward, we intend to build on CIPEC's achievements. We will work to ensure that CIPEC tools and services get out to the thousands of companies throughout Canada. We will actively support and nurture the federal-provincial energy dialogue that was launched last winter and which culminated in the publication of the document *Moving Forward on Energy Efficiency* by the Council of Energy Ministers in September 2007.

This document marks a watershed in federal-provincial cooperation on energy efficiency. It provides, for the first time, a national blueprint for cooperative efforts to advance energy efficiency. CIPEC is honoured to have helped prepare this blueprint.

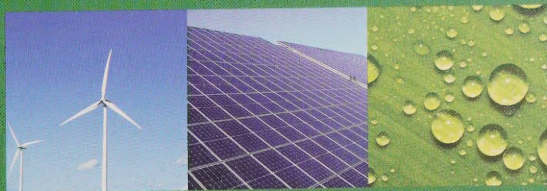
*Moving Forward on Energy Efficiency* is designed to engage all Canadians – governments, the private sector and individuals – in a nationwide effort to reduce energy consumption in homes and buildings, industry and on-road transportation. This document recognizes that different governments will want to pursue different priorities at different times, according to their unique situations. It offers tools that individual governments can choose to enhance energy efficiency and conservation.

This document also includes options for action on energy efficiency by sectors outside government, including professional and industry associations, retailers, financial institutions and others. These options range from energy-related training for professionals such as engineers and architects to the expansion of green financial instruments.

The tools are definitely a step in the right direction and reflect our firm commitment to ensure that Canadian industry has access to strong and comprehensive energy efficiency programs on a coast-to-coast-to-coast basis.

## Energy 2007 Conference

**Energy 2007, Canada's foremost industrial energy efficiency conference, took place in Ottawa on November 22 and 23, 2007. Geared to industry representatives – from senior decision-makers to engineers, operations managers and energy practitioners – this biennial event provided an opportunity to network and share ideas on tapping into energy-saving opportunities in Canada's industrial sector.**



Following on the successes of Energy 2003 and Energy 2005, CIPEC is once again helping to reinvigorate Canada's corporate commitment to industrial energy efficiency.

Under the banner "Ideas to Action," Energy 2007 took over where Energy 2005 left off. The two-day event included one day of "real world" hands-on training with abbreviated versions of CIPEC's highly regarded Dollars to Sense workshops, including the freshly minted workshop, "Energy Efficiency Financing." Natural Resources Canada's (NRCan) research scientists also held sessions about optimizing combustion systems and provided tours of the CANMET Energy Technology Centre.

On the second day, sessions were grouped under the following themes: Creating Awareness, Training for Competency, Innovative and Emerging Technology, Creating Value Through Energy Efficiency, and Seizing Energy Management Opportunities.

The opening plenary featured keynote speaker Ray Anderson, the founder and chair of Interface, Inc., whose "Mission Zero" message invited all companies to go green while at the same time increasing profits. A wrap-up panel discussion on the status and future of industrial energy efficiency provided a lively forum for debate.

The CIPEC Leadership Awards banquet featured an opportunity to highlight the achievements of 10 CIPEC companies who are making a difference, and their stories anchor this annual report. The banquet featured special remarks by David Anderson, Parliamentary Secretary to the Honourable Gary Lunn, Minister of NRCan. Anderson celebrated the successes of the award recipients and said that the Government of Canada is committed to helping industry become even more energy efficient in the years to come.



### Challenges and Opportunities

In the coming months and years, we will continue to work with governments to advance an aggressive energy efficiency agenda that reflects the capabilities of industry and exploits the enormous potential for energy savings, increased competitiveness and lower air pollution and greenhouse gas emissions.

It is estimated that energy efficiency initiatives alone could reduce energy demand in Canada by as much as 40 percent, effectively making these initiatives Canada's largest potential source of new energy! Win-win solutions to tap this potential are waiting to be developed and implemented, and CIPEC aims to be on the leading edge of these advances.

CIPEC is part of a rapidly growing worldwide movement to reduce industry's carbon footprint and energy consumption by tapping energy efficiency opportunities and improving energy management. As you read this text, we are building on the "Moving Forward" agenda by laying the foundations in Canada for the development of a new international energy management standard to complement existing ISO 9000 quality and ISO 14000 environmental management standards.

Management-based quality systems are a proven way to not only identify improvement opportunities but also to systematically implement and sustain their benefits. We will bring forward Canada's expertise and experience in the industrial energy management field as input to the development process and will support efforts to imbed energy management within organizations in any way possible.

We have entered an era of extraordinarily high energy prices, which brings with it opportunities for advancing energy efficiency. These higher prices mean better returns on any investments we make in more efficient energy systems and equipment. These higher energy prices turn what were once marginal possibilities into very worthwhile opportunities. They will also spur the development of new energy technologies that can decrease our reliance on carbon-based energy sources. The package of financial and tax incentives offered by the federal government and many of the provinces can only help to "sweeten" the opportunity.

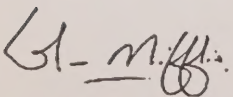
The rapidly rising cost of energy has a way of cutting through the clutter and focusing society's attention on finding new coping strategies. In the industrial sector, the best energy management resource available to Canadian industry is CIPEC. There has been no time in CIPEC's 33-year history that the need for this organization has been so great, its relevance so evident, and its potential to do good so strong.

Finally, I would like to thank everyone in the CIPEC family, both in industry and in government, for their passion and dedication to energy efficiency and the reduction of greenhouse gas emissions.

I would especially like to thank Philip B. Jago of the Industrial Programs Division. For more than a decade, Philip played a leading role in developing CIPEC and championing energy efficiency with Canadian industry. On behalf of CIPEC, I wish him well in his new endeavours as the Director of the Buildings Division in the Office of Energy Efficiency.

I also wish to express my gratitude to CIPEC's Task Force Council and the many volunteers on sector task forces for their continuing contribution to energy sustainability in Canada. Their dedication is essential to our success as we move forward to meet the rapidly growing energy challenges facing us in the coming months.

Sincerely,



**Glenn Mifflin**  
Vice-president, North Atlantic Refining Limited  
Chair, CIPEC Executive Board



## The Results

CIPEC brings exceptional value to Canadian industry while supporting Canada's drive to improve energy efficiency and reduce greenhouse gas emissions. Its extraordinary impact is clear – CIPEC delivers results.

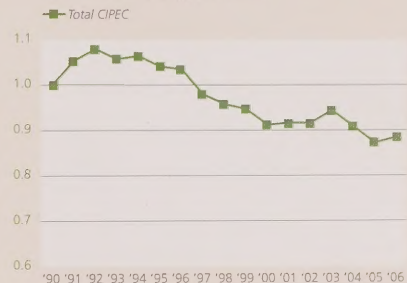
- The gross domestic product (GDP) created by CIPEC industries increased 44.2 percent between 1990 and 2006. With the help of effective energy management, energy consumption by these industries rose only 26.9 percent.
- In 2006, CIPEC industries created approximately 28 percent of the country's GDP and provided jobs for 3.5 million Canadians.
- The more than 5000 companies that CIPEC represents reduced their combined energy intensity by 11.6 percent between 1990 and 2006, an average of 0.8 percent per year.
- Improved energy efficiency enabled Canadian industry to avoid approximately \$3 billion in purchased energy in 2006 – enough energy to heat almost 3.8 million Canadian households for 1 year. If energy intensity had remained constant, GHG emissions would have been 37.4 megatonnes (Mt) higher.
- The mining, manufacturing and construction sectors improved their energy intensity by an average of 2.0 percent per year. Between 1990 and 2006, these sectors improved energy intensity by 27.4 percent.
- From the fall of 1997 to March 31, 2008, the CIPEC Dollars to \$ense workshops have helped companies save an estimated 11 470 terajoules of energy and reduced carbon dioxide emissions by 1273 kt.
- By the end of 2007, the *Heads Up CIPEC* newsletter had been sent to 10 000 recipients across Canada. This newsletter is distributed electronically twice a month.
- As of March 31, 2008, close to 1600 industrial facilities had signed on as CIPEC Leaders.

### Mining, Manufacturing and Construction Energy Intensity



The mining, manufacturing and construction sectors improved their energy intensity by an average of 2.0 percent per year between 1990 and 2006. This rate surpasses the public voluntary commitment made by these CIPEC members to achieve an average annual energy intensity improvement of 1.0 percent per year.

### Total CIPEC Energy Intensity



All CIPEC industries improved their combined energy intensity by 11.6 percent, or an average of 0.8 percent per year, between 1990 and 2006. If energy intensity had remained constant, GHG emissions would have been 37.4 Mt higher in 2006.





**ArcelorMittal  
Dofasco**  
page 8



**Catalyst Paper**  
page 12



**Ivaco**  
page 16



**MDS Nordion**  
page 20



**MJ Roofing**  
page 24



## Companies That Are *Making a Difference*







**Molson**  
page 28



**Rol-land Farms**  
page 32



**St Marys Cement**  
page 36



**Tembec**  
page 40



**Tolko Industries**  
page 44

THE CANADIAN INDUSTRY PROGRAM FOR ENERGY CONSERVATION (CIPEC) RECOGNIZES INDUSTRIAL ORGANIZATIONS FOR THEIR OUTSTANDING ENERGY MANAGEMENT EFFORTS. IN 2007, 10 COMPANIES WERE SINGLED OUT FROM AMONG HUNDREDS OF ORGANIZATIONS UNDER THE CIPEC UMBRELLA THAT HAVE MADE REDUCING THEIR CARBON FOOTPRINT A CRITICAL BUSINESS STRATEGY. THROUGH THEIR ESPECIALLY NOTEWORTHY SUCCESS IN REDUCING ENERGY CONSUMPTION AND LOWERING GHG EMISSIONS, THESE 10 COMPANIES ARE WINNERS OF THE CIPEC LEADERSHIP AWARDS AND ARE TRULY MAKING A DIFFERENCE FOR CANADA AND CANADIANS.



ArcelorMittal Dofasco

Hamilton, Ontario

Monitoring and Tracking



» With CorMEBM, everyone in the organization uses the same numbers and speaks the same language. Numbers now mean the same thing to everyone.

## New Tool Cuts *Energy Costs*

*The CorMEBM initiative mines energy and production data to find energy intensity opportunities.*





*"We cannot control the cost of our raw materials, but we can control our energy consumption."*

**Bob Savage**, General Manager of Primary Manufacturing



A new data-mining tool is enabling ArcelorMittal Dofasco to transform its vast storehouse of metering and production information into large energy reductions. In the process, the steelmaker is reducing its carbon footprint and its energy intensity.

Implemented at the beginning of 2006, the initiative is called the Corporate Mass and Energy Balance Model (CorMEBM). It draws on a complex array of data gathered throughout Dofasco's mill to provide consistent, meaningful spreadsheets that tell the company where, how and how much energy is being used. CorMEBM accesses the company's massive Oracle database and collects, converts and combines information about energy consumption in each of the company's production processes. CorMEBM makes energy consumption data meaningful and transparent throughout the mill, enabling the company to identify potential energy savings in each of its operating modules.

"We cannot control the cost of our raw materials such as iron ore, scrap iron or coal, but we can control our energy consumption," said Bob Savage, General Manager of Primary Manufacturing, which are the front-end processes in the mill that consume 85 percent of the mill's energy resources. "Energy represents a lot of money spent at our plant. Any efficiencies we gain mean huge dollars. That is why energy efficiency is so critical to our financial performance."

Based in Hamilton, Ontario, Dofasco has a long and enviable track record in the pursuit of energy efficiency. The company has been a CIPEC participant for three decades. In 1997, Dofasco was the first manufacturer to enter into an environmental management agreement with the federal and provincial governments to set environmental and energy efficiency goals. Energy is integrated into its environmental management system, which is registered under the ISO 14001:2004 standard.

As a result of its integrated energy management approach, aggressive energy performance targets and strong commitment to continuous improvement, the steelmaker improved its energy intensity (gigajoule per tonne of steel shipped) 19 percent in the 1990s and improved another 8 percent between 2000 and 2005.

"Dofasco has a strong commitment to energy efficiency and emissions reductions," Savage said. "It reflects our core philosophy of good corporate citizenship as much as our desire to control costs."

The principle underlying the CorMEBM model is simple: sort through the energy data the company already collects, decide which data are meaningful, and use them to create spreadsheets that management can use to make energy management decisions. However, implementing it was not simple.

"Dofasco has emphasized a team approach to energy management for the last decade or so," said Neil Macfadyen, Senior Project Manager, Steel Markets, for Union Gas Limited. "Cross-departmental projects like this only work when teamwork makes it possible to bring the right people to the table."

The CorMEBM development team began by searching the world for an off-the-shelf software tool that could do the job. They found no such tool that could handle the complexities of a steel mill. The team discussed hiring outside experts to develop a new tool but concluded that it would take too long for outsiders to learn the Dofasco system. Fortunately, Dofasco had the inside expertise to do the job.

Then the hard work began. "For the most part, the data we needed already existed but was scattered all over the place," said Sue Olynyk, Senior Energy Specialist, who is also Chair of the CIPEC Task Force Council. "We had to collect all of the data we needed, assess which was useful and which was not, and put the useful data into one central data base where we can store it in perpetuity."



"Energy represents a lot of money spent at our plant. Any **efficiencies** we gain mean huge dollars."



## DATA POINTS WERE DEFINED FOR EACH OPERATING MODULE IN THE PLANT.

THE MODEL COLLECTS DEFINED DATA POINTS AND CREATES DAILY AND MONTHLY SPREADSHEET REPORTS FOR EACH OPERATING MODULE.

The team created a data warehouse as well as a way to see and analyze the data. "There is a huge amount of data generated by an operation like ours," Olynyk added. "Each data point had to be validated, and where data points did not exist, we had to work with engineering assumptions. Data discovery was 80 percent of the work on this project."

Data points were defined for each operating module in the plant, based on a hierarchy of priorities. Directly measured meter data was the first choice, followed by accounting data, data calculated from other measurements and, finally, nominal data based on assumption and estimation. The model collects the defined data points and creates daily and monthly reports in spreadsheet format for each operating module.

"Most people are comfortable with Excel spreadsheets," Olynyk said. "They enable us to use the data for many purposes, including carbon reporting."

Linda MacMillan, Quality Systems Coordinator in Dofasco's Hot Mill, regularly works with CorMEBM. "The model allows us to monitor our energy use and drive improvement programs based on our performance," MacMillan explained. "What is great about CorMEBM is that different people in the organization are using the same numbers and speaking the same language. Now our numbers mean the same thing to everyone."

One of the most impressive energy efficiency opportunities identified with the help of CorMEBM is to use the residual heat of slabs leaving the steelmaking process to reduce the natural gas requirements of the plant's Hot Mill. In the past, slabs leaving the steelmaking shop were allowed to cool before they were reheated as they entered the Hot Mill – a process that requires substantial amounts of natural gas. Because slabs came from multiple sources and had different characteristics, it was difficult to move slabs into the Hot Mill before they cooled down.

The Hot Mill team looked for ways to utilize some of the slabs before they cooled. They estimated that, by balancing workload, the Mill could move some of the warm slabs into the mill at a temperature of about 400°C, reducing the amount of natural gas needed to bring the slabs up to the milling temperature of 1000°C. "We are currently able to use about 15 percent of the hot slabs," Savage said. "We are hoping to get that percentage up to 30."

Macfadyen knows that the CorMEBM tool impacts much of the work Union Gas is doing with Dofasco to reduce natural

gas consumption  
"Examining the energy flows from one department to another helps identify which energy projects are worth implementing," Macfadyen said. "Smart companies like Dofasco



realize that energy efficiency studies and projects can have a major impact on the efficiency of their processes."

Savage believes that CorMEBM is vital to the company's ability to manage its energy use. "The model has us on track to reach our energy intensity targets of 10 percent better than our 2000 performance by the year 2010. I am not sure that we have uncovered its full potential. We are still learning what it can do for us."





Catalyst Paper Corporation  
Crofton Division

Duncan, British Columbia  
Corporate Sustainability



Energy is one of a paper mill's major operating costs, and Catalyst realized that there were millions of dollars to be saved by being smarter about its electricity use.

## Conservation Culture Builds *Competitive Edge*

*Power Watchers initiative adds millions to the bottom line for this B.C. pulp and paper company.*



*"When employees put energy conservation into practice in their own homes, it becomes natural to practice it at work."*

**John Vanier**, Energy Manager



When BC Hydro announced its intention to implement a two-tier electricity price structure that would reward the efficient use of power, it got the attention of Catalyst Paper Corporation.

"Pulp and paper is a tough, competitive business," said Don McKendrick, Vice-president at Catalyst's Crofton Division. "Anything we can do to take cost out of the equation helps us be more competitive."

Energy is one of a paper mill's major operating expenditures, and Catalyst realized that there were millions of dollars to be saved by being smarter about its electricity use. How it went about improving its energy conservation results earned the company's Crofton Division a CIPEC Leadership Award for Corporate Stewardship.

Located near the southeast tip of Vancouver Island, the Crofton mill has a long record of active energy and environmental management. Since 2001, the mill has made major strides in replacing fossil fuel with wood waste, and management did not need much encouragement to move decisively to curb electricity consumption.

Catalyst's answer to the challenge posed by the new electricity rate structure was to implement "Power Watchers" programs at each of its four British Columbia mills. Power Watchers establishes a defined management structure and common approach to energy efficiency that harnesses the ingenuity and dedication of employees throughout the organization. While each mill operates independently, information and best practices are shared among plants.

The Crofton mill program, launched in March 2006, has three key objectives: (1) save millions of dollars in annual costs, (2) change the mill's culture to sustain the savings, and (3) implement a measurement and verification program to track, maintain and enhance improvements.

The program is built on an energy mandate and energy management plan designed to raise employee awareness, reduce energy waste, improve energy efficiency, optimize supply and integrate energy management into the organization. The company established a Power Watchers team comprised of operational managers, a technical service process engineer, an electrical engineer, a business analyst and a team leader who steers and manages the program. The team leader is John Vanier, who was appointed full-time Energy Manager in May 2006. The role is now co-funded by BC Hydro under a two-year contract.

The team's main goal is to institute sustainable energy management and conservation through lasting cultural change. The Power Watchers program, which involves the entire organization from mill management to the shop floor, makes self-sustaining action for energy conservation a way of life throughout the company.

The prize is worth the effort. A series of energy audits and assessments throughout the mill identified potential electricity savings of 11 to 15 percent, which is \$4.7 and \$6.5 million of the annual energy bill.

Power Watchers has produced significant energy conservation improvements at the Crofton mill. "I am very pleased with our progress," McKendrick said. "We set very aggressive targets right from year one. We exceeded them in each of the program's first two years and expect to exceed them again in year three."

McKendrick believes that there are three reasons for Power Watchers' success: senior management support, exceptional program management, and buy-in from employees on the floor. "The program is all about people," McKendrick said. "We get the greatest traction from people thinking about energy conservation and changing their behaviour."



*"Anything we can do to take cost out of the equation helps us be **more competitive.**"*



## EMPLOYEES ARE CONTINUALLY REMINDED OF THE VALUE OF USING ELECTRICITY WISELY

THROUGH EMPLOYEE MAGAZINE ARTICLES, POSTERS, TOOL BOX TALKS, DAILY NEWS COMMUNICATIONS AND AT REGULAR REVIEW MEETINGS AND BRIEFINGS.

Vanier has seen heightened interest in the program among employees. "The forest sector has been going through challenging times in recent years," Vanier said. "It is relatively easy to get people to focus on saving money for the company when times are difficult and jobs are on the line."

A key component of the Power Watchers initiative is communications. Employees are continually reminded of the value of using electricity wisely through employee magazine articles, posters, toolbox talks, weekly e-mail communications and at regular business reviews and briefings.

"Connecting what we do here with what people do at home is a big help," Vanier said. "When they put energy conservation into practice in their own homes, it becomes natural to practice it at work. It helps us establish a conservation lifestyle."

BC Hydro has been a partner in the program's success by providing resources and energy management and conservation training opportunities to the Power Watchers group.

Communication with the community is also a key part of Crofton Division's environmental mandate. "I have been very impressed in my dealings with Catalyst," said Jon Lefebvre, Mayor of North Cowichan, the municipal region in which the mill is located. "Mill management set up the Crofton Advisory Forum to work with the community on air quality issues and answer any and all questions that we might have. They are very open and willing to share their ideas and resources with the community. They are excellent corporate partners."

At the mill, employees have helped achieve reductions in expensive Tier 2 electricity energy purchases and electricity demand by adopting such practices as load shedding in peak demand periods and by looking for ways to improve processes. "Everybody is aware that we have to save dollars by saving power," said Dave Lord, an electrician at the mill. "In some cases, mill workers are making decisions to shut down assets in their area when they are not in use. This did not happen before the Power Watchers program was established and people became more concerned with energy waste. Power Watchers takes it to people where they live. I wish we had done this years ago."

In addition to better operating practices, the mill is also creating electricity consumption efficiencies through investment. In 2007, for example, Catalyst completed a thermomechanical pulp cleaner bypass project at Crofton that reduced needs by 2000 horsepower (hp). Similarly, a kraft brown stock simplification project lowered workloads by an additional 1500 hp. The mill also replaced mechanical steam turbine-driven fan drives on its power boiler with variable frequency electric drives, increasing the turbo generator output while also reducing fossil fuel consumption.

By the end of 2007, the British Columbia pulp and paper mill

achieved sustainable annualized savings of \$5 million as a result of its electricity waste reduction initiatives. Energy intensity dropped 10 percent from 1882 kilowatt-hours per tonne (kWh/t) of pulp



and paper to 1703 kWh/t by year-end.

In 2008, the mill plans to focus its waste reduction efforts on compressed air, water, lighting, steam and vacuum systems. It will also continue to improve the efficiency of pump systems, motors, refiners and agitators and to optimize supply. "We have an opportunity to finish capturing the low-hanging fruit in the next year or so," McKendrick explained.

The Crofton mill has been so successful at managing its electrical energy usage that it has captured nearly all of the available Tier 2 electricity savings opportunities. "We are getting down to the smaller ideas now," Lord said. "That is what we have to go after now."



CIPEC LEADERSHIP AWARD WINNER

CATALYST PAPER CORPORATION

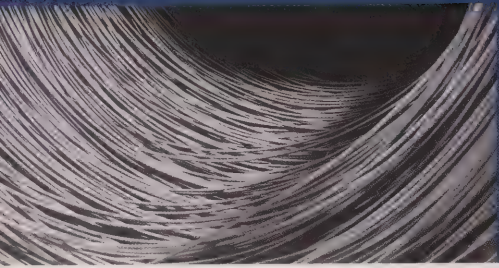


Ivaco Rolling Mills

L'Orignal, Ontario

Employee Awareness and Training

» Rolling wire requires high temperatures and heavy equipment, making natural gas and electricity major cost components of the finished product.



## Energy Management Is All *About People*

*The enManage approach helps this steelmaker engage employees to roll out energy savings.*





*"We believe that combining Dollars to \$ense workshops with enManage gives us a powerful tool for improvement."*

**Jean Ghannoum**, Assistant Energy Manager



When Ivaco Rolling Mills decided to take a close look at its energy efficiency, it approached the issue with systematic thoroughness and an "employees first" attitude. It is just what you would expect from a big business operating in a small town.

Ivaco is located on the banks of the Ottawa River in L'Orignal, Ontario, midway between Ottawa and Montréal. The plant's staff of over 500 works around the clock to produce more than 850 000 t per year of wire rod for the North American market. "Ivaco is a unique place," said Michael Fakhouri, Energy Solutions Consultant with Enbridge Inc. "It is a very well-built facility with excellent equipment, a very advanced plant."

No matter how advanced the plant, rolling wire requires high temperatures and heavy equipment, making natural gas and electricity major cost components of the finished product. So when Francois Abdelnour, the company's Energy Manager and the man responsible for purchasing and managing Ivaco's energy inputs, suggested to management that energy costs could be reduced, they jumped at the opportunity. "They liked the idea that we could both save money and reduce our environmental impact," Abdelnour said. "They saw it as a double win."

Ivaco approached the opportunity both systematically and passionately. The Energy Department analyzed existing energy management activities, explored practices and programs in other companies, and launched energy usage studies with the help of funding and incentives from Enbridge, CIPEC and Natural Resources Canada's (NRCan's) Office of Energy Efficiency. With the help of environmental and energy consultant Enviros, Ivaco selected an energy management methodology called enManage™ and customized it for their operations.

The company is no stranger to rigorous business systems, running extensive Kaizen, 5 S, 3R and ISO 9001 programs and working toward ISO 14001 and OHSAS 18001 accreditation. So the idea of adopting a systematic approach to energy cost reductions did not require a major paradigm shift.

Like Total Quality Management or Six-Sigma, enManage is a management system that focuses on the reduction of costs through continuous improvement. Also, like the other systems, it is designed to deliver savings through the introduction of low-cost and no-cost efficiency initiatives.

The enManage approach is based on proven methodology, specifically focusing on optimizing energy efficiency and utility usage. Combining a strong management approach with powerful energy management software, enManage takes a balanced view of energy consumption across an organization, basing improvements on the three pillars of people, systems and technology. "To make real gains, we must improve practices, change equipment and modify processes," Abdelnour noted. "This requires progress on all three pillars."

The energy management team identified people as the pillar that could deliver the most immediate results and also provide an implementation platform for systems and technology. They understood that the key to the program's success would be to capture the hearts and minds of the people on the shop floor. To win this battle, Ivaco created an energy savings structure that includes an energy coordinator, energy teams, training and communication. Energy awareness training programs were developed and delivered, and a climate for employee ownership of the energy efficiency initiative was established.

Ivaco trained teams of instructors through NRCan's Dollars to \$ense workshops. The teams then presented energy efficiency training to employees. All employees were covered, including new hires and summer students. Staff was trained to understand how energy is used and then to focus on finding no-cost and low-cost measures to reduce energy consumption. "The Dollars to \$ense workshops enabled us to deliver specific hands-on training," said Jean Ghannoum, Assistant Energy Manager and the man with direct responsibility for implementing the enManage program. "We believe that combining the workshops with enManage gives us a powerful tool for improvement."



*"We have already discovered that we can **save money** by bypassing certain steps for certain products."*



## EMPLOYEES SUBMITTED MORE THAN 200 ENERGY SAVINGS IDEAS IN 2007.

IVACO IMPLEMENTED 90, GENERATING A 1.2 PERCENT IMPROVEMENT IN PLANT ENERGY CONSUMPTION AT LITTLE COST.

Throughout the mill, workers are encouraged to adopt an "eliminate, combine, change and simplify" mindset, which is supported by an employee energy savings suggestion plan that includes incentives and awards and a program of regular communications. "Employees are thinking more about energy savings everywhere in the mill," said Jean-Marc Fauteux, an electrician lead hand at the mill. "When we see a potential saving, we bring it forward to the committee."

Success came quickly for the enManage program as employees submitted suggestions for improvements in practices and processes. An employee idea to change the cooling process to reduce the number of pumps operating from three to one led to \$112,000 in electricity savings annually.

Another worker noticed that electrical heat-tracing units used to prevent water pipes from freezing were left on year-round. Turning them off when not needed led to \$8,000 in annual savings. A third employee suggested that occupancy sensors could be installed on dozens of fluorescent lights in utility rooms to turn lights off automatically when the rooms were not occupied. This saved thousands of dollars more in lighting costs. Similarly, installing occupancy thermostats in the utility rooms saves as much as 40 percent in natural gas heating costs. These thermostats reduce the temperature to 10°C when the rooms are unoccupied.

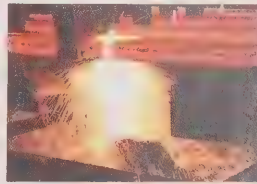
"Employee buy-in is high," said Fauteux. "It is even affecting some of our contractors, who are spotting energy efficiency opportunities and drawing them to our attention."

In total, employees submitted more than 200 energy savings ideas in 2007, and the company implemented 90 of them. This generated a 1.2 percent reduction in plant energy consumption at little cost to the company.

Ivaco is also advancing the two other pillars of the enManage program: systems and technology. The company installed 65 new electricity and natural gas meters and reactivated 15 in order to track its energy use more closely and provide information needed to implement controls and plan

improvements. The mill installed energy monitoring software Montage™ from Danfoss Solutions A/S and customized the user interface to improve accessibility and comprehension for users. These measures contributed an additional reduction of 0.8 percent in energy consumption.

"When I first started thinking about monitoring and tracking, I was not sure how it would help us," Abdelnour said. "We already knew how much energy we were using and what it cost us. Then I realized that better metering, monitoring and tracking systems could provide us with a more meaningful level



of information, telling us where we are doing better, where we are doing worse and where we need to make improvements. We have already discovered that we can save money by bypassing certain steps

for certain products. These systems also provide weekly and monthly reports on key performance indicators to keep senior management in tune with what is going on and where action is needed."

Ivaco set an energy reduction target of \$1.2 million for 2007 and an equally ambitious \$1 million target for 2008.

"Monitoring and targeting will contribute about \$300,000 to this target," Ghannoum said, "with the rest coming from low cost and other projects. We have tons of ideas to implement."

"The high commitment and dedication of everyone at Ivaco has led to impressive savings," said Bob Robinson, Consulting Group Manager for Enviros Consulting. "I believe that striving for energy efficiency and savings are now truly embedded in their culture and will lead to continued and sustained savings."

"I am extremely impressed with what they have achieved," Enbridge's Fakhouri said. "It was a three-year-long effort with a lot of hard work and dedication. But they have a plant full of very good people. That really helps to make positive change."



| CIPEC LEADERSHIP AWARD WINNER

IVACO ROLLING MILLS



MDS Northon

Cleveland, Ohio

A Medtronic Company



LeanSigma enables this health sciences company to see all of the variables and all of the outcomes in advance, leading management to the right choices.

## The System Is *the Thing*

*LeanSigma creates the energy management platform for a health sciences leader.*



*"We cannot be a world leader without quality processes."*

**Steve West**, President



In health sciences and molecular medicine, precision, quality and agility are not goals – they are requirements. For MDS Nordion, meeting these requirements led to the deployment of LeanSigma® as a platform to improve the company's management of energy.

Ottawa-based MDS Nordion is a global leader in innovative technologies for medical imaging, targeted cancer treatments, and sterilization of medical devices. The company exports medical isotopes, radiotherapeutics and related technologies to more than 50 countries around the world. It meets over half of the global demand for molybdenum-99 (the source of technetium-99m, the most widely used isotope for diagnosing disease) and over half of global demand for cobalt-60, which is used to sterilize medical products.

In an industry that requires relentless pursuit of innovation and attention to detail, there is no substitute for a management system that plans, organizes, analyzes and documents progress. MDS Nordion found such a system in LeanSigma, a business improvement model developed by TBM Consulting Group.

"We cannot be a world leader without quality processes," said company President Steve West. "While we have always had effective quality systems in place, LeanSigma provided us with a more vigorous approach to measuring our performance and managing our operations. It enables us to see all of the variables and all of the outcomes in advance and leads us to the right choices."

Implemented by MDS Nordion in 2006, LeanSigma methodology is applied to systems and procedures throughout its plants to improve processes, eliminate waste and reduce variability in operations. Employees use LeanSigma's measurement and statistical tools to examine existing processes in detail, identify areas of waste, and then standardize new, more efficient and effective processes. The methodology integrates perfectly with the company's focus on innovation,

commercial excellence and continuous improvement. "Through LeanSigma, we are getting our people to challenge convention and embrace change," West said. "It fundamentally remaps and reprograms the way we do things."

With its disciplined methodology and focus on reducing waste through measurement and management, LeanSigma is a perfect tool to apply to energy efficiency. It enables the company to create a concise map of its energy use, identify improvement opportunities and implement change. Also, by employing a consistent management "language," LeanSigma encourages a transparent, team-driven approach.

The company's first energy efficiency project under LeanSigma was a concerted effort to reduce its electricity consumption. Applying LeanSigma's DMAIC (Define, Measure, Analyze, Improve, Control) approach, the project team looked for ways to reduce the Ottawa facility's \$2-million annual electricity bill. By incorporating a previous energy audit of their facilities into the process and brainstorming with employees to identify root causes of inefficiencies, they found their most promising opportunities in plant lighting and heating, ventilating and air conditioning (HVAC).

Launching a pilot project in one of its older buildings, the company re-engineered its lighting systems to introduce new technology, reduce wattage and eliminate unneeded fixtures. The company also improved lighting and HVAC usage practices. "We were using 600 volts to light one area," said David Collar, Senior Purchasing Agent and leader of the energy efficiency team. "By installing new technology, we were able to reduce the voltage to 347 volts, providing more reliability and safety for our employees without sacrificing lighting quality." Also, the new bulbs have a three-to-five-year operating life, reducing the need to halt production to replace burned-out bulbs overhead – a nearly weekly event with older lights.



*"Initial LeanSigma energy efforts delivered enough electricity savings to **power 327 homes.**"*



# THE LEANSIGMA METHODOLOGY IS APPLIED TO SYSTEMS AND PROCEDURES THROUGHOUT MDS NORDION PLANTS

THE APPROACH IMPROVES PROCESSES, ELIMINATES WASTE AND REDUCES OPERATIONAL VARIABILITY.

Although light levels in some areas were reduced to eliminate overlighting, "people actually like the quality and brightness of the light better," said Jennifer Mahoney, Environmental Specialist. "They are experiencing less eye fatigue and fewer headaches with the new lighting."

The pilot project produced impressive electricity savings, leading to a full rollout of the program in all buildings on the Ottawa campus. The company estimates that it has achieved an 18 percent decrease in hydro consumption, with annual savings totalling 3 277 654 kWh – enough energy to provide electricity to 327 homes.

Encouraged by its success in reducing electricity consumption, MDS Nordion turned its attention to natural gas. "The success of the hydro project really helped us get approval for the natural gas project," Collar said.

MDS Nordion applied the same disciplined LeanSigma approach to natural gas. "They analyzed the plant thoroughly," said Michael Fakhouri, Energy Solutions Consultant with Enbridge. "They hired people to conduct infrared studies of the buildings, looked at HVAC equipment and analyzed plant operations for efficiencies. They went into great detail to find both big and small opportunities. They did it right."

The company found that there were substantial opportunities for energy efficiency gains. It decided to move on a number of fronts, reconfiguring rooftop HVAC units, improving the lead-pouring process, reducing backup steam boiler pressures, fine-tuning temperature and humidity balances, improving building insulation, automating steam trap monitoring, and installing a solar wall to offset space-heating loads.

Combined, these activities produced an estimated 15 percent reduction in natural gas usage, saving enough energy annually to satisfy the gas needs of 83 homes. With the success at its Ottawa headquarters, MDS Nordion is now planning similar initiatives for its Vancouver, British Columbia, and Laval, Quebec, locations.

Fakhouri believes that top-down commitment throughout the organization was a critical factor in the success of the project. "They were very effective at communicating from management to the shop floor," Fakhouri said. "They were able to deliver on what they found."

MDS Nordion views energy efficiency not only as an economic issue but also as part of its social responsibility. "Corporate

citizenship and environment health and safety are always at the top of our management agenda," West explained. "It is all about the quality of our brand, our profile and our culture. Everything

that we do must be high quality. At the end of the day, it is what makes us competitive."

LeanSigma is a registered trademark of TBM Consulting Group





MJ Roofing & Supply Ltd.

Windsor, Ontario  
Customer Service



Meeting its Go Green commitment  
has transformed an already socially responsible  
commercial roofing company into a model of  
environmental management.

## Going Green from *Top to Bottom*

*MJ Roofing's award-winning environmental program  
takes energy efficiency to the next level.*



*"If we promote high standards to our customers, we have to live up to them in our own operations."*

**Larry Willman, Owner**



Participation on the board of directors of the Manitoba branch of the Building Owners and Managers Association (BOMA) prompted Larry Willman to make a pivotal business decision. He figured that if he was encouraging others to join BOMA's Go Green initiative, he had better join too.

The decision committed his Winnipeg company, MJ Roofing & Supply Ltd., to a program focused on maximizing its efficiency and minimizing its environmental footprint. Meeting this commitment has transformed an already socially responsible commercial roofing company into a model of environmental management and a CIPEC Leadership Award winner for Corporate Stewardship.

"We are strong believers in maintenance as a business principle," Willman said. "We believe that this principle applies to keeping our operations up to date as well as to maintaining the quality and efficiency of our facilities and equipment. If we promote high standards to our customers, we have to live up to them in our own operations. It is better for the bottom line and better for the environment."

To meet MJ Roofing's commitment to the BOMA program, the company established a "Go Green" committee including Willman, the company controller and staff members from various departments. The committee focused on working with staff to find waste reduction opportunities, including the reduction of its carbon footprint through improved energy efficiency.

Assisted by employee participation and opportunities identified by an energy audit of MJ Roofing's facility, the committee took action on a number of fronts. "I was surprised at how many things we did that wasted energy," Willman said. "We realized that if we spent a little money on the environment now, it would pay dividends later."

MJ Roofing's Go Green committee began implementing changes immediately. The company installed new, energy efficient T8 fluorescent lighting to replace T12 fixtures and installing T5 fixtures to meet new lighting needs. It installed motion detectors to control lighting in its boardrooms and improved heating boiler efficiency to 87 percent by adopting better maintenance practices. It is saving water by installing low-flow-tap aerators and low-flush toilets, and it plans to test a waterless urinal for use in its men's washrooms. Automatic timers will be installed on thermostats to reduce building temperatures in off hours.

MJ Roofing's building envelope was also targeted for energy waste. The company installed new energy-efficient windows, and it is insulating the building with the help of a grant from Manitoba Hydro.

"I am amazed that they would even attempt the Go Green process," said Sue Ziemski, Past President of BOMA Manitoba and a facility manager for CREIT Management L.P. "They operate from a beautiful old landmark building that was not built with energy efficiency in mind. They took the process seriously and acted immediately when opportunities were identified. They gave their building a whole new life and became the first industrial building in Manitoba to achieve Go Green certification."

"Our program was easy to implement because, as a smaller, owner-operated business, we can make decisions on the spot," Willman said. "Any project with a payback under three years was an immediate 'go.' Projects with longer or nonexistent payback take more thought, but we will do them if we can afford them and can see the benefits."

One of the most impressive initiatives MJ Roofing launched under its Go Green umbrella was a comprehensive recycling program. The company was able to divert three times more



*"Recycling systems were not available through the City. MJ Roofing created their own."*



## MJ ROOFING GAVE THEIR OLD BUILDING A WHOLE NEW LIFE

AND BECAME THE FIRST INDUSTRIAL BUILDING IN MANITOBA TO ACHIEVE BOMA  
GO GREEN CERTIFICATION.

waste material to recycling than it initially estimated, and the "Go Green" committee is now looking to take the process a step further by moving toward a paperless office. "Where we currently collect two large bins of paper for recycling, we want to reduce it to one by being smarter about how we use paper," Willman said. "Our goal is to keep increasing the use of electronic documents to replace paper."

"They diverted a phenomenal amount of garbage from landfill," Ziernski said. "Recycling systems for their operation were not available through the City. They had to create their own program."

According to Syndi Prokopich, Executive Assistant to Willman and Go Green committee head, the company's emphasis on recycling has had a positive side effect. "The recycling program we started here is carrying over into our employees' day-to-day lives outside of work," Prokopich explained.

MJ Roofing is a leader in the use of advanced roofing technologies and is constantly on the lookout for newer, more efficient systems for its customers. "'Green' was the big buzzword at this year's International Roofing Convention," Prokopich said. "We are looking seriously at cooler roofs, thermoplastic polyolefin (TPO) and garden roofs as possible new solutions for our customers. We are also looking for environmentally friendly products and better ways to dispose of roof waste."

"It is easier to be on the leading edge than to try to catch up later," Willman noted. To support its efforts to introduce new concepts to its customers, MJ Roofing is planning to install two rooftop gardens on its own building and capture rainwater to irrigate the gardens. The company is also testing the use of solar lighting.

MJ Roofing's energy efficiency efforts extend beyond its building. The company carefully maintains its fleet of vehicles and ensures that tire pressures are set for optimum fuel efficiency. It has also accelerated its fleet upgrade program reduce maintenance costs and ensure cleaner running MJ Roofing is looking at the adoption of electric and other energy-efficient technologies to minimize the carbon foot of its operations in the field.

"Our front office staff are very positive about the Go

program,  
Holke, Assist  
Controller. TI  
has been bolstered by  
the CIPEC Lead  
award. "Winning the  
award is a very big deal  
in Winnipeg," Prokopich  
said. "It has given us a  
huge market boost and real motivation to continue improving."



huge market boost and real motivation to continue improving."





Molson Montréal Brewery

Montréal, Québec

Brewing and Bottling

## Installing meters at Molson's Montréal brewery uncovered

opportunities to save millions of dollars in energy  
costs with little or no capital spending.



# Molson Brews Energy Savings in Its *Montréal Facility*

*This monitoring and tracking system points  
the way toward energy savings.*



*"We want to make sure that we are utilizing our current equipment as correctly and efficiently as possible first. Then we can begin investing in new energy-efficient equipment where such investments make sense."*

**Daniel Pelland**, Chief Brewing Officer



Installing meters is not a glamorous idea, but it can be one of the most significant steps a company can take on the road to energy efficiency. For Molson's Montréal brewery, it uncovered opportunities to save millions of dollars in energy costs with little or no capital spending.

Meter installation was part of a Molson energy efficiency initiative launched in 2002 in conjunction with the adoption of a new operating strategy. The purpose of the strategy was to achieve excellence in all areas of operations through capital investment, best practice development and sharing among the breweries.

"Our new Molson Production Strategy marked a change from independent business enhancement actions by our individual breweries to a concerted national improvement strategy," said Daniel Pelland, Molson's Chief Brewing Officer. "The energy component of the new strategy focuses on how we manage our natural gas, electricity and water resources."

To help define energy savings opportunities, the company installed hundreds of meters throughout its five Canadian breweries in 2004. In Montréal, the meters provided the raw information needed to implement a brewery-wide energy monitoring and tracking system. Information collected by the network of electrical, natural gas and water meters enable the plant energy efficiency team to isolate sources of waste and identify improvement opportunities.

"There are two sides to energy use in our facilities," said the company's Development Brewer, Paul Swindall. "There is the production side, where large quantities of energy are converted into steam or heat, and the demand side, where energy is actually put to use in the production process. Although the demand side is harder to get at, we felt it offered us the best opportunity to make gains by improving our processes without significant capital spending."

Pelland agrees. "We want to make sure that we are utilizing our current equipment as correctly and efficiently as possible first. Then we can begin investing in new energy-efficient equipment where such investments make sense."

Monitoring and tracking activities prompted the brewery to implement a number of operating improvements that had a dramatic impact on energy consumption. Two projects, in particular, were representative of the plant's practical approach to energy efficiency: harmonizing boiler steam pressure and re-engineering the packaging line start-up process.

During the beer-making process, steam is utilized in many areas, including wort boiling, tank cleaning, bottle washing and beer pasteurization. Traditionally, boiler steam pressure was maintained at 112 pounds per square inch (psi), although most steam consumers within the brewery required 60 psi or less to operate.

The production team agreed to experiment to find the lowest boiler pressure that was needed to provide optimal steam flow at all consumption points within the brewery. To make this happen, staff planned to lower pressure in four incremental phases: from 112 to 105 psi, from 105 to 100 psi, from 100 to 95 psi and from 95 to 90 psi. The brewery used the metering system and process temperature verification to ensure that all major users were unaffected after each phase was implemented.

The experiment paid off. Staff determined that boiler steam pressure could safely be reduced to 100 psi, saving \$200,000 in annual natural gas costs without affecting operational parameters.

"Our energy efficiency focus began as a cost control exercise," Pelland said. "But it became a passion among employees throughout our organization." A prime example of this transformation is the remarkable initiative in the Montréal brewery to cut energy waste from the packaging line start-up process.



*"Environmental **sustainability** is one of Molson's core values."*



## MOLSON'S ENERGY EFFICIENCY FOCUS

### BEGAN AS A COST CONTROL EXERCISE,

BUT IT BECAME A PASSION AMONG EMPLOYEES THROUGHOUT THE ORGANIZATION

Routine analysis of meter charts revealed that the packaging lines were starting up 12 hours (hr) before production begins. A closer review revealed that bottle washers, pasteurizers and conveyor lubrication systems were consuming steam, water and electricity at a rate similar to normal operation, even though no beer was being packaged. The packaging line start-up crew explained that it was easier to start the line as early in their shift as possible to identify and correct unexpected problems before they could affect production. After the equipment was running, they were able to continue other, less critical preparatory activities.

The crew, which included Alain Spencer, Michel Guy, Richard Deveau and leader Rock Voyer, was asked to help save energy by finding a way to reduce non-productive run time. With experience averaging about 30 years per man, all the crew members know everything there is to know about their machines. Nobody knows the start-up process better.

At first, the crew was not sure that they could improve the process, but they found ways to choreograph the work flow to delay the start time of the pasteurizers, fillers and soakers that comprise the packaging line. It took several months to get it right, but when new procedures were perfected on one line, they were then applied to the others.

Metering, monitoring and tracking, combined with the efforts of people who know the process best, has enabled the Montréal brewery to cut machine start-up time by close to half, saving the company more than \$100,000 per year on its electricity bill. Because all Molson breweries have the same metering system and comparable equipment and processes, similar opportunities were identified in breweries across Canada.

Molson's emphasis on energy efficiency and environmental issues goes well beyond purely business implications. "Energy is a big part of what we do in our lives," Swindall said differently in a brewery. Our people are really excited that, by saving energy, they are able to do something good for the environment."

"Environmental sustainability is one of Molson's core values," Pelland noted. "We are constantly asking what we can do to reduce our environmental impact."

The company's attitude has not gone unnoticed. "Molson understands that social responsibility and sustainable

are good for business," said Johanne Riverin, Vice-president, Communication, Awareness and Education, at Recyc-Québec. "They are a responsible company that wants their



processes to be sound and correct environmentally, and they are continuing their efforts to remove as much waste from their business as possible. Molson wants to be among the companies who are recognized for their environmental efforts."

The next step at Molson? "Getting the attention of all our people and building a culture of environmental stewardship," Pelland said. "Our monitoring and tracking systems are a good foundation for raising awareness, providing employees with the power to take action and the feedback they need to continue to reduce our environmental footprint."

"Measurement gives our plant energy teams the leverage they need to drive change," Swindall said. "Now that we can measure, we can make people responsible for the energy used in their areas on a process-by-process basis."



| CIPEC LEADERSHIP AWARD WINNER

MOLSON MONTRÉAL BREWERY



Rol-land Farms Ltd.

Can't Get to the Green?

Find Us! We're in the Greenhouse!



Rol-land Farms' operating philosophy  
is simple – become as cost efficient as possible.

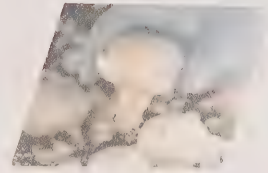
## Practical Thinking Leads to a *New Energy Model*

*This mushroom grower makes big changes  
at its Ontario mushroom farm.*



*"When you know you have dollars and cents going up the chimney, you have to fix it."*

**Hank Vander Pol**, Co-owner



When Rol-land Farms Ltd. purchased a large mushroom farm in Campbellville, Ontario, and two others in Alberta and Prince Edward Island in 2005, the agribusiness became the biggest producer of mushrooms in Canada. It also acquired a big energy management headache.

"We knew from the performance of our existing plants what kind of energy consumption to expect," said Adrian Van Dyk, Special Projects Coordinator for Rol-land Farms. "The new plants were not as good."

The company decided to focus on improving the Campbellville plant. Following an initial analysis of energy use, Rol-land decided to shut down production and refurbish the least efficient building at the facility. Rol-land then commissioned a third-party energy audit of the Campbellville facility, the results of which were reported to the company in January 2006.

The audit revealed that the company could achieve the greatest improvements in the shortest time by upgrading natural gas-powered equipment. Based on the audit's recommendations, management quickly began implementing an upgrade and replacement program. Its goal was to improve energy efficiency per unit produced.

"We want to get more production out of each square metre of compost with less energy," Van Dyk said. "Our owners are very progressive. When they made the decision to improve energy efficiency, they did not hesitate to spend money to do it."

"It is very simple," said Hank Vander Pol, who, with brother Peter and Arthur, owns and manages Rol-land. "It is all about becoming as cost efficient as possible. When you know you have dollars and cents going up the chimney, you have to fix it."

Practical thinking is typical of Rol-land's owners. The brothers grew their agribusiness from a family farm to a major agricultural enterprise by doing their homework, making intelligent decisions and acting decisively. In 1980, the Vander Pols expanded beyond the traditional crops they grew in southwestern Ontario by building Rol-land's first mushroom plant. Expanding its operations through acquisition, they grew production from 32 000 kilograms (kg) (70 000 pounds [lb]) per week in 1980 to more than 591 000 kg (1.3 million lb) today.

In Campbellville, Rol-land took action on five key energy fronts, three affecting natural gas consumption and two impacting electricity. To seal its building envelope more effectively, Rol-land eliminated three redundant overhead doors and changed its procedures to ensure that the remaining doors remained closed when not in use. It launched a room-by-room process to replace roof insulation, which had deteriorated over time.

The company modified its boiler plant systems by installing linkageless electronic burner controls, improving condensate recovery and adding a stack economizer to recover exhaust heat and use it to preheat boiler feed water. These changes led to an 18 percent reduction in fuel consumption.



It is very simple. It's all about becoming as **cost efficient** as possible.



## IN CAMPBELLVILLE, ROL-LAND TOOK ACTION ON FIVE KEY ENERGY FRONTS.

THREE REDUCED NATURAL GAS CONSUMPTION AND TWO REDUCED ELECTRICITY CONSUMPTION

Improvements were also made to production processes. The company consolidated its steam-off activities into two rooms and is investigating using steam generators instead of boilers for steam-off. This could increase the process's efficiency from 77 percent to 95 percent. A new compost bunker system gives the company better control over mushroom substrate decomposition while reducing natural gas consumption in the compost tunnels by 57 percent.

Electricity consumption has also been reduced. The company reduced electricity demand by about 9.5 percent when it replaced an inefficient cooling and chiller system with two new 900-t chiller units and a 2000-t cooling tower. Rol-land is also installing variable frequency drives on the plant's water pumps. "Our refrigeration system was becoming obsolete," Hank Vander Pol noted. "We had to replace it soon, so we decided to do the project now, using energy-efficient equipment. It solves two problems at the same time."

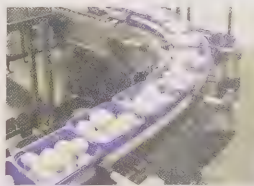
Rol-land's energy efficiency initiatives were encouraged and assisted by Joseph Lee, Account Representative at Union Gas. "We met with Rol-land and initiated potential energy savings opportunities," Lee said. "They can improve profitability by lowering energy costs." Rol-land took advantage of Union Gas incentives to study energy-saving opportunities and help fund new equipment. "Rol-land is looking at the long-term sustainability of their business," Lee added. "Energy efficiency can give them an edge by managing and reducing their production costs."

Upgrades around the farm are introducing computerization to control temperature and humidity as well as carbon dioxide and oxygen levels. "This has a direct impact on quantity as well as quality," Hank Vander Pol said. Rol-land is also installing metering and monitoring equipment, creating a measurement platform around which the company can build an energy management program. Such a program will enable Rol-land

to modify production processes and systems to better utilize energy and take advantage of opportunities for peak shaving, load shifting, and demand response programs as well as improved monitoring of energy efficiency initiatives

What the company is learning at Campbellville will be rolled out in its other plants. "We measure each facility separately," Van Dyk noted. "This allows us to identify best practices and apply them to all of our facilities."

Along with energy efficiency activities at the farm, Rol-land is reducing its environmental footprint in other ways. The company constructed a wetland biofilter system to treat



wastewater generated by mushroom growing activities. The wetland filters all wastewater produced at the farm and allows for 90 percent recycling and reuse of approximately 72 million litres (L)

(19 million gallons) in the composting process. Previously, this wastewater was trucked away and disposed of at the regional wastewater treatment facility.

"I was impressed with the management at Rol-land Farms," Lee said. "They listened to our ideas and asked a lot of intelligent questions. When they saw the advantages, they made a commitment and took action."

Once all renovations and upgrades are complete, the Campbellville facility will not only be a model of energy efficiency; it will also double its production of white and brown mushrooms. This should make it the largest mushroom farm in North America.



CIPEC LEADERSHIP AWARD WINNER  
ROL-LAND FARMS LTD.



St Marys Cement Inc.

Bowmanville, Ontario

Employee Awareness and Training

»» Everything about a cement plant is  
large, and big equipment comes with large energy bills.



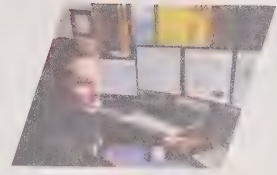
## A Motivated Workforce Solidifies *Savings*

*Good ideas lead to low cost energy savings  
at this Ontario cement plant.*



*"What St Marys is doing on their own to encourage energy efficiency is an excellent example of good corporate stewardship."*

**Kamiel Gabriel**, President and Chair, Durham Strategic Energy Alliance



St Marys Cement Inc. is living proof that you can teach an old dog new tricks. The latest trick at the company's Bowmanville, Ontario, cement plant is to take a close look at the use of energy and find better ways to manage it.

Founded in 1912, St Marys Cement has been a major producer of cementitious materials in the Great Lakes region, supplying such landmark projects as the CN Tower, Roy Thompson Hall, Maple Leaf Gardens and the Darlington Nuclear Station, as well as countless other engineering, civic and residential projects.

Everything about a cement plant is large. Quarrying with explosives is followed by the use of huge earth-moving equipment that scoops up and transports tonnes of limestone, which is loaded into giant crushers and conveyed to a massive rotary oven called a kiln. Big equipment comes with large energy bills.

"The industry is highly energy intensive," said Environment Manager Martin Vroegh. "But our product is very green by comparison. Being known as a green company helps us to demonstrate sustainability within the industry and in the country."

Motivated by the desire to do as much as possible to preserve the environment while at the same time lowering its cost of doing business, St Marys Cement invited employees at its Bowmanville plant to an energy management workshop sponsored by NRCan. The workshop's goal was to start involving employees in evaluating and improving the company's energy management practices.

Following up on opportunities identified during the work Vroegh and Jim Storey, Electrical Maintenance Manager, recommended that the energy committee conduct an energy audit, establish a training program, develop a budget for energy projects and develop a process to monitor and trim energy use.

"St Marys has always been committed to environmental stewardship, so when an opportunity to become more energy efficient presented itself, we took the initiative to put a formal structure in place," Vroegh said. That structure, known throughout the company as "E=MC<sup>2</sup>" (Energy Management Conservation Committee), is staffed by experts from each area of the plant and encourages employee participation and effective internal communications. Its goal is to develop and implement a program that achieves excellence in the reduction of energy consumption and dollars spent.

"We created energy committees at St Marys Cement plants in Bowmanville and St. Marys," Vroegh said. "We provided CIPEC Dollars to \$ense workshops for management and maintenance people. We also showed all of our people how to save energy at home. This fosters an energy efficiency awareness that they bring back to work. We want our people to understand that energy efficiency is a new way of thinking, not a demand for a big change in the way they do their jobs."

The Bowmanville committee developed 45 energy-saving initiatives and energy-efficient projects. The team also identified practical solutions that could be implemented in plants across North America, such as installing photo cells in often unoccupied areas and optimizing fan bypass systems. New procedures were also integrated into the plants' ISO 9001/14001 system to help drive continuous improvement into the future. The Bowmanville plant is also piloting a new program of "Certification in Energy Excellence" in partnership with 360 Energy Inc.



"Being known as a green company helps us to demonstrate **sustainability** within the industry and in the country."



# EVERYTHING ABOUT A CEMENT PLANT IS LARGE.

AND BIG EQUIPMENT COMES WITH LARGE ENERGY BILLS.

At the Bowmanville facility, simple, low-cost energy saving projects produced instant results. For example, the plant installed photocells on outdoor lighting to switch off lighting when ambient light conditions made additional lighting unnecessary. This project offers a potential reduction of 8925 watts, yielding an estimated annual saving of \$2,736.

Occupancy sensors were installed in various office areas, saving an additional \$1,300 per year in lighting costs. Cathode ray tube monitors were replaced with LCD screens, producing another \$1,500 in savings.

Four large, low-speed, high-volume ceiling fans were installed in the Quarry Service Building, reducing energy consumption for heating and cooling by using air circulation. In the summer, pushing the air down creates a cooling wind-chill effect. In the winter, pulling cool air up forces warm air down in areas where plant staff work. The fans reduce the energy needed for heating and cooling by about 20 percent, saving about \$1,150 per year in energy costs.

"We were able to eliminate the use of 1000 L per day of diesel fuel by replacing compressed air cooling on production hot spots with fans," said Fabio Garcia, Production Manager.

Other projects delivered similar results. Optimizing the bypass mechanism on its cement-making system saved the company \$100,000 in annual energy costs at no capital cost. Cooler baghouse heat exchanger fans were reprogrammed, saving an additional \$45,000 per year. Thousands of dollars more were saved by shutting down machinery when not needed, turning off unnecessary lighting, and unloading petcoke fuel when electricity rates were lower.

The largest single saving came from load shifting – waiting for off-peak periods to run the plant's finishing mills. This saved an estimated \$258,000 in annual electricity costs. "Reducing peak hydro use reduces the need for coal-generated electricity and utilizes cleaner hydroelectric and nuclear sources," Vroegh said. "This is better for the environment and reduces our overall carbon footprint."

The company's success in reducing its environmental footprint has not gone unnoticed. Last year, the company received 2006 Portland Cement Association Environmental Performance Award North America.

"What St Marys is doing on their own to encourage energy efficiency is an excellent example of good corporate

stewardship," notes Kamiel Gabriel, President and Board Chair of the Durham Strategic Energy Alliance. "They are doing what we see as an emerging trend among companies to



take on the responsibility of building a culture of energy efficiency."

"Employees feel better working for a company that cares about the environment," Garcia explained. "Energy efficiency is not only good for society; it is also good for the motivation and attitudes of our people."

"Thanks to the forethought of  $E=MC^2$ ," said Erik Madsen, St Marys Cement Chief Executive Officer, "we now have a documented road map for energy conservation success and an easily duplicated organizational structure that is being considered for deployment across all of the company's North American operations."



| CIPEC LEADERSHIP AWARD WINNER  
ST MARYS CEMENT INC.



Tembec Inc.

100% Renewable Energy  
Sustainable Forestry  
Sustainable Forestry



» Tembec's business is structured around cost containment. When energy prices started to rise, the company was ready to deal with them.

## Cost Reduction Mandate Drives a *Company-wide Transformation*

*This forest sector giant takes a national approach to energy management.*



*"Management has given all of our mills a mandate to reduce costs, and energy is a major area of opportunity."*

**Les Kosiak**, Corporate Manager, Thermal Energy



A well-oiled offence and rock-solid defence are the keys to reducing energy costs for forest products leader Tembec Inc.

"We identified energy early on as a significant cost component in our business," said Les Kosiak, Tembec's Corporate Manager, Thermal Energy. "Management has given all of our mills a mandate to reduce costs, and energy is a major area of opportunity."

Headquartered in Témiscaming, Quebec, Tembec is a leading integrated forest products company with over 50 manufacturing units operating in North America and France. It manufactures and markets pulp and paper, wood products, paperboard and specialty chemical products, and produces silvichemicals from by-products of its pulping process.

The company's annual sales total about \$3.5 billion.

"We have had a long-term interest in reducing our environmental impact," said Tembec President and CEO Jim Lopez. "Our business has been structured around cost containment for some time, and we had energy efficiency practices in place. When energy prices started to rise, we were ready to deal with them."

Philippe Barrette, the Mayor of Témiscaming and a retired forester, is impressed by Tembec's environmental record. "Tembec is a leader in resource stewardship. The company continues to invest in sustainable operations, both in the forest and at their plants," Barrette said. "It is open and transparent in its dealings. Tembec is a great corporate citizen committed to the communities where it operates."

Tembec began focusing on energy efficiency in 2002 as part of a corporate effort to green its operations. It intensified its efforts three years later as strong competition, international market conditions and rising energy prices increased the pressures on its financial performance. In 2005, with strong support from the CEO and senior management, the company more than doubled its corporate energy staff. "We set up a group to facilitate the transfer of information among our plants and to provide both oversight and hands-on help," Kosiak noted. The company had management's buy-in and needed a mechanism to carry the energy efficiency banner into its plants.

To accelerate its energy management efforts, Tembec implemented both short-term (defensive) and long-term (offensive) strategies. Its defensive strategy takes aim at cost return projects with minimal investment requirements, while its offensive strategy focuses on ideas, such as electrical generation improvements, which require significant investments with longer paybacks. The company began with its pulp and paper operations, which are Tembec's largest energy users, representing more than 85 percent of Tembec's energy bill.

The company's defensive effort is carried out at the mill level. A mill-site energy reduction plan was prepared for each mill to help identify opportunities and support action. The defensive plan is built upon this foundation.

An energy champion at each pulp and paper mill acts as a coach and change agent, keeping the momentum going and information flowing. Each month, mills update their defensive strategy and reduction documents, which are then sent to all divisions as a means of sharing information, establishing best practices and generating ideas. Energy "success stories" are also shared, detailing positive achievements and providing a mechanism to expand savings possibilities across divisions.

To keep management informed of progress, monthly, quarterly and annual fossil fuel and electricity key performance indicators are generated for each pulp and paper site and for a select few Forest Products divisions. Data on energy use and greenhouse gas (GHGs) emissions are generated quarterly and rolled into an annual corporate management review. Consumption data reports are also used to sustain employee awareness and involvement in progress toward company reduction targets.

Because Tembec intensified its energy management efforts in the middle of 2005, its pulp and paper mills have made significant progress in shoring up their defences against the rising costs of fossil fuel and electricity. Focusing on projects that could be completed for \$50,000 or less, the company gave priority to high return and cost-effective projects. Mill staff were encouraged to identify and recommend improvements that could be made at little or no cost. Some ideas, such as better steam trap maintenance, were straightforward, while others took innovative approaches to process design. Some were specific to an individual mill site; some were transferable to other sites.



Our long-term goal is to *eliminate dependence on maintenance*



## EVERYONE AT TEMBEC KNOWS

### WHERE ENERGY PRICES ARE GOING

THEY UNDERSTAND THAT THEY CAN MAKE A CONTRIBUTION TO THE SUCCESS OF THE COMPANY AND THE SURVIVAL OF THEIR MILL.

"Our long-term goal is to eliminate dependence on fossil fuels," Lopez said. "Our performance to date has been excellent, with double-digit gains each year over the last few years. Once you mobilize the organization around the task, you can come up with surprising results."

The willingness of employees across the company to take ownership of energy management is a major reason for the success of Tembec's cost reduction initiatives. "Everyone in the company knows where energy prices are going," Kosiak said. "They understand that they can make a contribution to the success of the company and the survival of their mill." Yves Grenier, Process Engineer at Marathon Pulp in Marathon, Ontario, agrees. "Once people know why they need to do something, they usually buy in," Grenier said. "Once they get involved, the success rate improves."

Improvements were recorded across Canada. At the Spruce Falls mill, for example, technical, operations and process control groups improved turbo generator power output by maximizing boiler output, more effectively controlling header pressure, and lowering header set points.

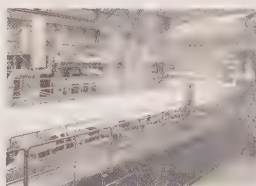
At no capital expense, the mill increased biomass-generated power by 2 megawatts (MW), producing offsetting power costs by as much as \$3500 per day. Mill personnel also reengineered the facility's white water system to cut steam heating needs. The project saved 6000 lb/hr of steam, producing an annual saving of \$350,000 at a project cost of just \$40,000.

At the Skookumchuck, British Columbia, softwood kraft mill, staff discovered that de-aerator pressure could be reduced in its boiler processes, thereby cutting steam needs by 4000 lb/hr while increasing power production by 0.4 MW in their turbo generator.

"Reducing system constraints enabled us to generate more electricity," said the mill's Energy Representative, Chris Lague. "The more energy we produce from biomass, the more fossil-free electricity we can sell to the grid." The project, which was completed at no cost, helped yield \$75,000 in annual energy savings. The plant is fully energy self-sufficient.

By changing the way ash is removed from the mill's biomass boiler, engineering, technical, and operational groups at the Témiscaming mill have improved the production of steam and eliminated ash removal gas usage. The change, made with no capital expenditure, cut energy costs by approximately \$235,000 per month during the winter period. A separate investment to reduce makeup water and steam requirements at the mill saved the company \$430,000 in six months paid for itself in seven months.

Maintenance, technical and operational groups at the F. L. Smith mill in Manitoba, newsprint mill, improved the production of steam from the mill's recovery boiler's heat recovery unit. The increased steam capacity has reduced Pine Falls' dependence on coal and lowered fossil fuel



purchases by 20 percent, or \$400,000 per year.

Marathon Pulp Inc., located in Marathon, Ontario, modified its recovery boiler precipitator operations. New generation rectifier units were programmed to balance rectifier output to online stack opacity, saving \$123,000 annually in electricity costs for an incremental investment of only \$2,500.

In the company's 2006 fiscal year, Tembec's worldwide pulp and paper sites reduced fossil fuel purchases by 18 percent per tonne of product, and they achieved a further 5 percent reduction in 2007. The company saves about \$25 million annually as a result of its energy efficiency program, while spending less than \$5 million. Energy savings in 2006 brought with them greenhouse gas emissions reductions of about 150 000 t annually.

Despite Tembec's impressive success in reducing energy consumption, Lopez knows the environmental portfolio is never closed. "We cannot sit and relax," Lopez said. "There is a lot more to do. Our competitors are getting better too."



| CIPEC LEADERSHIP AWARD WINNER

TEMBEC INC.



Tolko Industries Ltd.  
Heffley Creek Division

Vernon, British Columbia

Process and Technology Innovation

Replacing natural gas with readily available biomass energy fits perfectly with Tolko's energy efficiency and global competitiveness strategies.

## Cutting Edge Technology Changes the *Energy Paradigm*

*Transforming wood waste into clean-burning synthetic gas fires up this B.C. plywood mill.*



*"Using wood waste to replace natural gas is clearly in our interest and fits well within our broad energy efficiency and global competitiveness strategies."*

**Randy Chan**, Vice President and General Manager, Environmental and Forestry



It is a simple equation. Making plywood takes heat. Plywood mills are surrounded by combustible wood waste. Put the demand together with the supply and you have a perfect solution.

Almost. While wood waste is plentiful, using it to produce controlled combustion where it is needed throughout the process is logistically impractical. Mills have been forced to turn to easier-to-manage fuels such as natural gas while the piles of wood waste grow around them and are diverted to other uses.

Tolko Industries Ltd. decided to find a better way. In 2005, the company got together with Nexterra Energy to turn wood waste into a high quality synthetic gas that could displace natural gas and bring the mill closer to energy self-sufficiency.

"We have a very strong interest in energy," said Randy Chan, Vice-president and General Manager, Environmental and Forestry, at Tolko. "Using wood waste to replace natural gas is clearly in our interest and fits well within our broad energy efficiency and global competitiveness strategies."

"This project has two goals," said Michael Towers, Manager of Tolko's Energy Supply and Systems. "It reduces energy costs and emissions at a plant that is the company's largest natural gas consumer. With energy costs continuing to rise, the benefits of the project will continue to increase."

Tolko is a Canadian-owned forest products company based in Vernon, British Columbia, with operations throughout western Canada. The company is a major producer and marketer of lumber, veneer, plywood, oriented strand board, and kraft papers, with over 3500 employees working in its mills.

The principles of gasification have been well understood for over 200 years. Coal gasification was widespread during the late 1800s, providing fuel for urban lighting and power generation until the era of inexpensive oil and gas, which began after World War II. In recent years, escalating fossil fuel and electricity costs have ignited renewed interest in gasification technology, but the concept had not been applied to this type of industrial operation to provide heat until Tolko hired Nexterra to design and build a gasification system for the Heffley Creek mill in Kamloops, British Columbia.

Nexterra's proprietary thermo-chemical gasification technology provides a clean, versatile and low-cost means of converting wood and other solid fuels into synthetic gas, or "syngas," which is then used to produce heat and power for application within the plant. The gasification process differs from combustion because it uses just 20 to 30 percent of the air (oxygen) needed for complete fuel combustion. During gasification, the amount of air supplied to the gasifier is carefully controlled so that only a small portion of the fuel burns completely. This "starved air" combustion process provides sufficient heat to pyrolyze and chemically break down the balance of the fuel into gas.

Unlike energy derived from the direct incineration of many waste fuels, syngas is a clean-burning fuel that can be used as a substitute for natural gas, fuel oil or propane to produce process heat, steam, hot water or electricity using conventional energy recovery equipment.

"Surprisingly, the installation and launch of the Nexterra system encountered very few problems," Towers said. "We were able to ramp up to full speed fairly quickly. Now we are fine-tuning the process to maximize the emissions benefits of the system."

The gasification installation at Heffley Creek is fully automated for unmanned operation. Wood fuel is bottom-fed into the centre of a dome-shaped, refractory-lined gasifier. Combustion air, steam and/or oxygen are introduced into the base of the fuel pile. Partial oxidation, pyrolysis and gasification occur at 815°C to 982°C (1500°F to 1800°F), converting the wood fuel into syngas and non-combustible ash. The ash migrates to the base of the gasifier and is removed through an automated in-floor ash grate. The clean syngas is directed through energy recovery equipment to produce usable heat.

"Syngas appears to deliver a gentler heat than natural gas," observed Gary Miller, Veneer Plant Superintendent at the mill. "It is less severe on drying wood, which reduces cracking and warping in the veneer and improves glue adhesion."

The technology installed at the Heffley Creek mill produces an exceptionally clean syngas, reducing heat exchanger clogging



*"Surprisingly, the installation and launch of the **Nexterra system** encountered very few problems."*



## TOLKO'S HEFFLEY CREEK SYNGAS PROJECT RAMPED UP TO FULL SPEED QUICKLY.

NOW THE COMPANY IS FINE-TUNING THE PROCESS TO MAXIMIZE THE SYSTEM'S EMISSIONS BENEFITS.

and minimizing maintenance and downtime. The gasifiers produce extremely low particulate emissions (typically <50 milligrams per cubic metre) that can eliminate the requirement for air pollution control. By tightly controlling combustion temperatures in the fuel bed below the ash melting point, clinkering is avoided and a highly granular, easily flowing ash is produced.

"The gasification system has made us much more aware of our hog fuel capabilities," Miller added. "We used to try to get rid of it. Now we see it as a resource. Our thinking has changed quite a bit." The current syngas system uses about one third of the plant's available hog fuel. Tolko is looking at adding a second gasifier to produce energy for its plywood plant.

In addition, volatile organic compound (VOC) emissions produced by veneer drying are vented back into the combustion chamber on the gasification system. This diversion makes it possible for VOCs to be burned off instead of being vented into the air, thereby reducing the plant's environmental footprint.

Another major advantage of the Nexterra technology for Tolko is the ability to reduce gasifier output to less than 20 percent of maximum capacity while maintaining stable operation. Similarly, gasifiers can quickly be "idled" to standby mode during shutdown periods and then brought back to full capacity within two hours. This saves fuel and avoids the need for shutdowns and restarts during periods of low heat demand. Moreover, operating temperatures within the system remain low (well under 537°C [1000°F]), reducing maintenance and increasing refractory life.

"We love the system," Miller said. "We are really happy to have it."

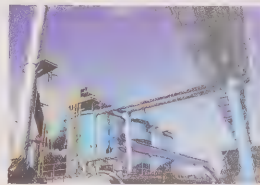
Nexterra believes that gasification systems such as the one at Heffley Creek are more cost-effective than alternative technologies because they are simpler in design, contain less equipment and have fewer moving parts. "The Nexterra installation is very competitive with the other biomass technologies we currently use," Towers said. "Plus, it has enhanced environmental, technological and operating

advantages over other technologies." Since the gasification system was brought on line in May 2006, it has reduced its natural gas purchases by an estimated annual rate of \$1.5 million and cut GHGs by 12 000 t per year.

"This project underscores Tolko's commitment to invest in technologies that make our mills more energy self-sufficient and improves our environmental and bottom-line

performance," said Baskerville, Tolko's Regional Manager for Veneer and Plywood.

"We are very pleased with the Nexterra gasifier system. It is user-friendly, simple to operate, and we are



working with Nexterra to identify opportunities where we can apply the technology at other Tolko mills."

"This is tremendous news for the forest industry," said Jim Dangerfield, Vice-president, Western Region, for Forintek, Canada's Wood Products Research Institute. "Despite progress toward energy self-sufficiency, the industry still consumes billions of dollars of fossil fuel." Switching from natural gas to syngas technology, Dangerfield continued, "has the potential for widespread application in the forest industry to reduce reliance on fossil fuels, cut costs and improve competitiveness."

"Tolko is a terrific partner, and we will continue to support their goal of becoming energy self-sufficient," said Jonathan Rhone, Nexterra's President and CEO. "This project demonstrates how our technology can help customers regain control of their energy costs by switching to alternative fuels. The concept of an 'inside-the-fence' syngas utility has widespread application in the forest products and other industries as leading companies invest in fuel conversion technologies."



CIPEC LEADERSHIP AWARD WINNER  
TOLKO INDUSTRIES LTD.



# Putting Ideas

Through CIPEC, Canadian industry and NRCan have created an **energy efficiency toolbox** that helps companies improve their operations.



# Into Action

## ecoENERGY

The Government of Canada has reaffirmed its commitment to the Canadian Industry Program for Energy Conservation (CIPEC). Through its leadership role in promoting industrial energy efficiency as a vehicle for clean energy supplies, CIPEC encourages Canadian industries to use energy more efficiently and to develop energy technologies. Under the ecoENERGY for Industry program, the government allocated approximately \$20 million over four years for the following:

- promotion of information sharing on new technologies and best practices in energy
- training for energy managers to identify and put in place energy-saving projects
- cost-shared assistance for process integration assessments to identify a wide range of ways to improve energy use

In the federal Budget 2008, accelerated capital cost allowance (CCA) treatment for investment in the manufacturing and processing sector includes a one-year extension of the 50 percent straight-line accelerated CCA, followed by a two-year period during which accelerated CCA will be provided on a declining basis.

In particular, for manufacturing and processing equipment that would otherwise be included in Class 42, businesses will be allowed to apply the accelerated 50 percent straight-line CCA treatment to investment in manufacturing and processing machinery and equipment acquired in 2009. Such assets will be included in Class 29.

In addition, the government increased its commitment by offering the ecoENERGY Retrofit program to small and medium-sized organizations. Industrial facilities that have fewer than 500 employees and commercial and institutional buildings smaller than 20 000 square metres may be eligible for funds through contribution agreements with ecoENERGY Retrofit – Small and Medium Organizations.

ecoENERGY Retrofit will pay \$10 for every gigajoule saved, up to 25 percent of the cost of a project, to a maximum of \$50,000. Projects can include improvements to buildings and upgrades to equipment. Recipients of funding in this category may also qualify for funding support from utilities and other levels of government.

For more information, visit the Office of Energy Efficiency's (OEE's) Web site at [oee.nrcan.gc.ca/industrial/financial-assistance/retrofit/](http://oee.nrcan.gc.ca/industrial/financial-assistance/retrofit/).



## Putting Ideas *Into Action*



### Sector Task Forces

#### ENERGY EFFICIENCY TOOLBOX

CIPEC's exceptional track record of success is driven by its 27 industry-sector task forces whose members coordinate each sector's efforts to advance an industry-wide energy management agenda. The task forces are led by 52 committed trade organizations representing companies that understand the importance of energy efficiency to industrial competitiveness and corporate citizenship. Combined, CIPEC task forces represent more than 5000 companies encompassing more than 98 percent of Canada's industrial production.

CIPEC task forces educate, motivate, inform and engage industrial organizations to pursue continuous improvement in the use of energy. They organize benchmarking studies, create energy management guides, host energy conferences, promote new technologies and best practices, and sponsor industry-specific workshops. Regular task force meetings provide a venue for energy managers to discuss problems, identify opportunities, tour facilities and share ideas. Backed by CIPEC's access to the resources of Natural Resources Canada (NRCan) and the Government of Canada, the task forces are powerful partners in the march toward a more energy-efficient Canada.

CIPEC task forces also help individual companies bring energy efficiency concepts to the shop floor. Through participation in task force activities, companies expand their knowledge, discover innovative ideas, establish useful relationships, acquire new skills and improve their energy management programs. In turn, the task forces provide companies with an essential gateway to valuable energy efficiency resources.



## CIPEC Leaders

Companies that make a formal commitment to energy efficiency through CIPEC gain access to CIPEC's programs, products and services. Administered through the OEE, the CIPEC Leaders initiative is growing in leaps and bounds because it delivers exceptional value to participating companies.

Becoming a CIPEC Leader company is easy. A company makes a commitment in writing to the CIPEC Chair to develop energy efficiency improvement targets and an action plan. In return, the CIPEC Leader company becomes eligible for discounts on Dollars to \$ense energy management workshops, for customized workshops, and for access to NRCan industry officers who help the company find information, make connections and navigate the energy efficiency waters. Companies in non-regulated sectors are also eligible for financial incentives under NRCan's ecoENERGY Retrofit program.

CIPEC's annual reporting requirement helps companies track their energy management programs and measure their year-over-year progress toward improved energy efficiency. Companies also receive recognition for corporate responsibility through inclusion in CIPEC's annual report, NRCan's Web site and the *Heads Up CIPEC* newsletter.



## Putting Ideas *Into Action*



### Dollars to \$ense Workshops

#### ENERGY EFFICIENCY TOOLBOX

Dollars to \$ense workshops provide organizations with the information and motivation they need to launch, focus and invigorate their energy management programs. Participants return to the workplace with new ideas to lower operating costs, improve competitiveness, reduce greenhouse gas emissions and save their company money. More than 14 000 people have attended these workshops.

The four Dollars to \$ense one-day workshops introduce participants to energy management fundamentals and illustrate their importance with examples from the shop floor.

**Energy Master Plan** workshops help participants jump-start their energy management programs by using tools and proven methods. They learn how to

- build an energy management team
- capture immediate savings opportunities
- develop an effective business case for energy efficiency projects
- involve employees

**Spot the Energy Savings Opportunities** workshops help companies identify ways to save energy and reduce costs. The workshops explain energy basics and point participants toward immediate savings by highlighting opportunities to improve the energy efficiency of fans, pumps, boiler systems, facility utilities, and other equipment and systems.

**Energy Monitoring** workshops are based on the principle that one can manage only what one measures. These workshops demonstrate how to use energy monitoring and tracking systems to improve energy management and lower energy costs.

**Energy Efficiency Financing** workshops focus on what is required to build a successful business case for an energy-efficient project. Participants analyze the energy savings and cost of sample projects and learn about internal and external revenue sources to finance the project.

Organizations in every industrial sector have used Dollars to \$ense workshops as key components of their energy efficiency program. They have found that these sessions are an inexpensive and effective way to increase awareness, identify opportunities and motivate action.



## Putting Ideas *Into Action*



### Benchmarking Studies

#### ENERGY EFFICIENCY TOOLBOX

By studying facilities across an industrial sector, benchmarking provides companies with a standardized method of comparing their own performance with others in their industry. Benchmark studies not only show companies how they are doing, but also provide the information, motivation and targets to help them advance their energy management programs.

Benchmarking studies look deeply into energy management practices and systems within companies, comparing them with those of other companies with similar practices and systems by using consistent methodology and data. By providing the means to compare apples with apples, companies can quickly learn where they stand and where they must improve.

Since 2001, 18 CIPEC sectors have undertaken benchmarking studies of more than 268 facilities – yielding invaluable data and providing impetus for change.



## Heads Up CIPEC

Twice each month, the *Heads Up CIPEC* electronic newsletter brings a wealth of useful information to your desktop. *Heads Up CIPEC* issues include news about new technologies and innovative approaches to energy efficiency, company case studies showcasing energy management successes, alerts about upcoming energy-related events, helpful tips, and links to energy management programs and resources. The *Heads Up CIPEC* distribution list currently exceeds 10 000 subscribers.

### Publications

For a complete list of publications available through CIPEC, including energy management guides, performance reports, case studies, newsletters and annual reports, visit [oee.nrcan.gc.ca/industrial/technical-info/index.cfm](http://oee.nrcan.gc.ca/industrial/technical-info/index.cfm).



# An Overview of CIPEC Data Gathering You Can't Manage *What You Don't Measure*

**Accurate measurement and meaningful data are fundamental to measuring energy improvements.** Data used in this report are collected primarily by Statistics Canada, with funding from Natural Resources Canada (NRCan) and Environment Canada, and supplemented by information from associations participating in the Canadian Industry Program for Energy Conservation (CIPEC) as well as other government bodies.

Statistics Canada data are collected through the annual Industrial Consumption of Energy Survey, which covers approximately 4000 establishments in the manufacturing sector. The survey gathers information by establishment on energy fuel consumption in natural units for 13 fuel types in 87 manufacturing industries. Survey results are used to track energy efficiency improvements, calculate carbon dioxide emissions and inform the public about energy conservation.

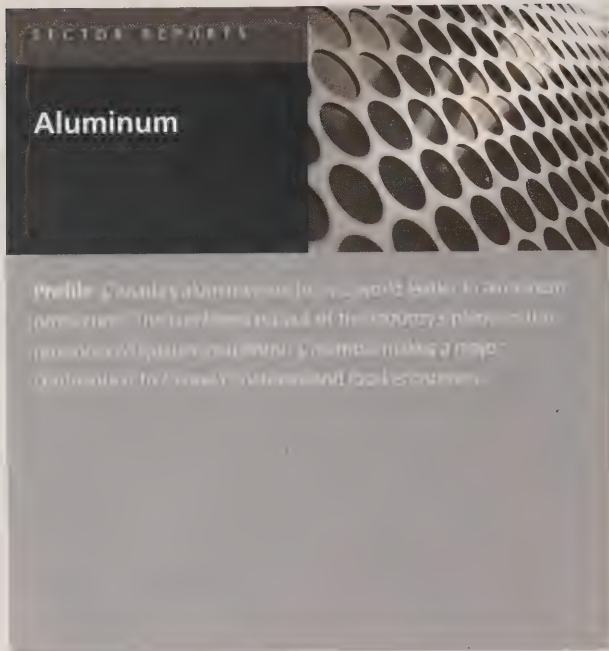
In its continuing efforts to make it easier for companies to respond to the survey, Statistics Canada began streamlining the questionnaire and the data collection process in data reference year 2004. These changes include standardizing some special industry questionnaires, making provisions for respondents to explain major changes in energy consumption to minimize follow-up enquiries, and converting fuels to a standard unit of measure.

Data analysis and interpretation involve the collective effort of NRCan's Office of Energy Efficiency (OEE), CIPEC trade associations and the Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC) at Simon Fraser University in Burnaby, British Columbia. CIEEDAC then produces energy intensity indicators for each sector based on production and gross domestic product. Primary funding for CIEEDAC comes from the OEE, with additional contributions from industry associations that participate in CIPEC and from the provinces of Quebec and British Columbia.

Much of the data is available on-line. Statistics Canada data are published in CANSIM table 128-0005 – Energy fuel consumption of manufacturing industries in natural units, by North American Industry Classification System (NAICS) and table 128-0006 – Energy fuel consumption of manufacturing industries in gigajoules, by NAICS. The link to Statistics Canada is [cansim2.statcan.ca](http://cansim2.statcan.ca). The OEE publishes *Energy Efficiency Trends in Canada* on an annual basis at [oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data\\_e/publications.cfm](http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/publications.cfm). Data from CIEEDAC are available at [www.cieedac.sfu.ca/CIEEDACweb/mod.php?mod=userpage&menu=16&page\\_id=9](http://www.cieedac.sfu.ca/CIEEDACweb/mod.php?mod=userpage&menu=16&page_id=9).







## Highlights

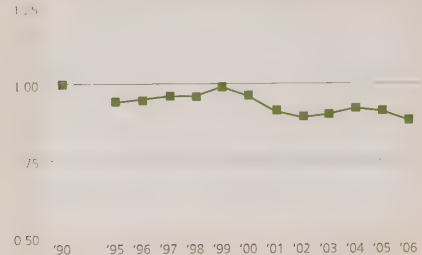
- The aluminum industry produced 3.051 million tonnes (t) of aluminum in 2006, which is an increase of 5.4 percent over 2005, and a 94.7 percent increase since 1990.
- Energy consumption in the aluminum sector increased 70.4 percent between 1990 and 2006 to 187 151 terajoules (TJ).
- Energy intensity over the same period decreased 12.5 percent, from 70.1 to 61.3 gigajoules/tonne (GJ/t).
- Most of the aluminum sector's energy needs are for electricity; electricity accounts for 92 percent of the sector's energy consumption in 2006.

### Aluminum Sector – NAICS 331313

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

— Energy Intensity Index



Data source:

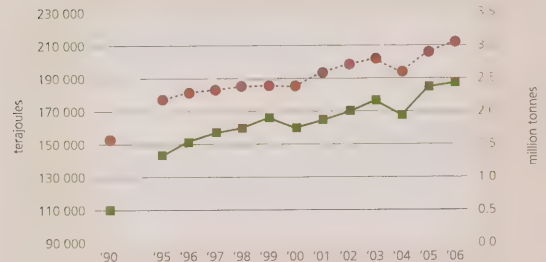
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, Ottawa, December 2007

Production – Natural Resources Canada, Production of Canada's Leading Minerals, December 2007

### Aluminum Sector – NAICS 331313

Total Energy and Production Output (1990–2006)

— Total Energy (HHV) • Production



Data source:

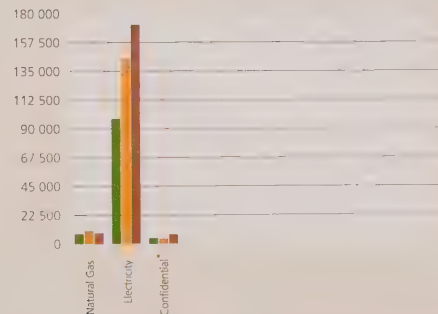
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, Ottawa, December 2007

Production – Natural Resources Canada, Production of Canada's Leading Minerals, December 2007

### Aluminum Sector – NAICS 331313

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



\* Confidential includes Heavy Fuel Oil (HFO), Middle Distillates (LFO) and Propane (LPG)

Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, Ottawa, December 2007

## SECTOR REPORT

## Brewery

## Profile

The Canadian brewing industry is a significant contributor to the economy, producing over 1.5 billion litres of beer annually. The industry is characterized by a high degree of energy efficiency, with a focus on reducing energy consumption and greenhouse gas emissions. The industry's energy intensity index has decreased significantly over the past decade, reflecting the industry's commitment to sustainable practices.

## Highlights

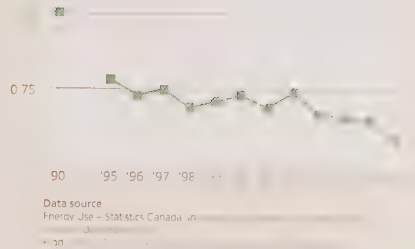
- The Canadian brewing industry currently uses 41 percent less energy to produce a hectolitre of beer compared with 1990.
- In 2006, the industry consumed 4835 TJ of energy: 68 percent was natural gas and 22 percent was electricity.
- Process integration studies have enabled Canadian brewers to find substantial energy efficiency opportunities.

## Brewery Sector – NAICS 31212

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

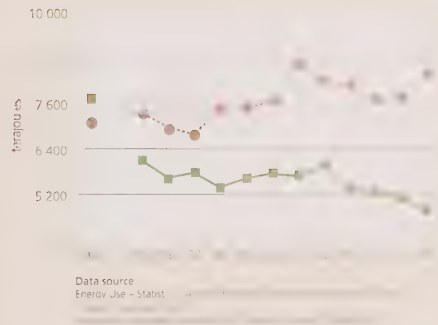
■ Energy Intensity Index



## Brewery Sector – NAICS 31212

Total Energy (HHV)

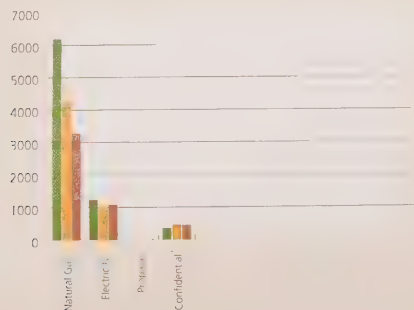
■ Total Energy (HHV) ■ Propane



## Brewery Sector – NAICS 31212

Energy Sources (Total Energy)

■ 1990 ■ 2000 ■ 2006



\*Confidential includes Heavy Fuel Oil (HFO) and Middle Distillate (LFO)

Data source: Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, Ottawa, December 2007





Highlights

- The cement industry produced 16.7 million t of cementitious products in 2006, which is a 34.3 percent increase since 1990.
- Energy consumption increased 15.1 percent between 1990 and 2006 to 63 900 TJ.
- Energy intensity between 1990 and 2006 decreased by 14.3 percent.
- The cement industry has a comprehensive, global strategy for achieving clean air and climate change objectives, while remaining competitive:
  - energy efficiency solutions
  - substitution of renewable and alternative energies for fossil fuels
  - substitution of supplementary cementing materials for clinker. Clinker production is energy-intensive and greenhouse gas (GHG)-intensive.
  - research and development on innovative materials and processes

Cement Sector – NAICS 327310

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

■ Energy Intensity Index

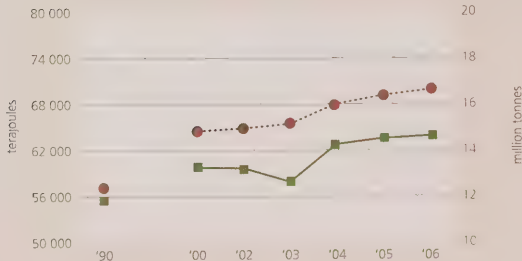


Data source:  
Fuel Consumption and Cementitious Production – Portland Cement Association (PCA),  
Spring 2008

Cement Sector – NAICS 327310

Total Energy Consumption and Production Output (1990–2006)

■ Total Energy (HHV) ● Cementitious Production

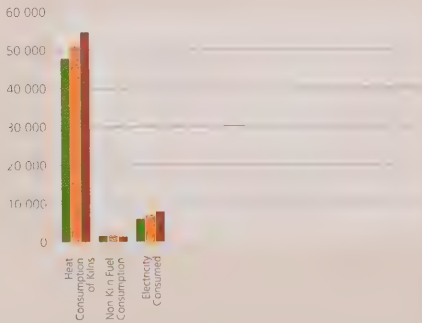


Data source:  
Fuel Consumption and Cementitious Production – Portland Cement Association (PCA),  
Spring 2008

Cement Sector – NAICS 327310

Energy Consumption by End Use in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



Data source:  
Fuel Consumption and Cementitious Production – Portland Cement Association (PCA),  
Spring 2008

## SECTOR REPORTS

## Chemical

**Profile:** The chemical sector represents a dynamic and innovative industry, with various divisions producing a wide range of products. Within the sector, the Chemical Industry Association (CIA) represents the interests of the industry and promotes the use of chemicals in a safe and responsible manner. The CIA also provides information on the environmental performance of the industry and promotes the use of sustainable chemicals.

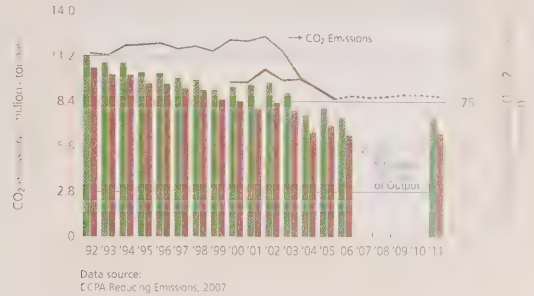
## Highlights

- Product output increased 37 percent since 1992.
- Carbon dioxide emissions from all CCPA members decreased 31 percent from 1992 to 2006.
- The GHG emissions from member companies in 2006 were 60 percent less than the 1992 amounts. This reduction is millions of tonnes of carbon dioxide equivalent emissions.

## Chemical Sector – NAICS 325100, 325200

Carbon Dioxide Emissions vs. Product Output (1990–2006)  
(from CCPA Member Operations)

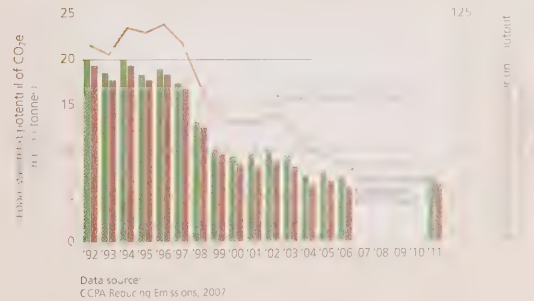
- CO<sub>2</sub> Emissions Intensity
- CO<sub>2</sub> Emissions Intensity (Excluding Co-generation)
- CO<sub>2</sub> Emissions Current Members
- CO<sub>2</sub> Emissions All Members --- Projections



## Chemical Sector – NAICS 325100, 325200

Global Warming Potential vs. Product Output (1992–2006)  
(from CCPA Member Operations)

- GWP Intensity
- GWP Intensity (Excluding Co-generation)
- GWP Emissions All Members --- Projections





## Highlights

- The construction sector reduced its energy consumption 9.2 percent, and the gross domestic product (GDP) increased 40.5 percent since 1990.
- The reduction in energy use, coupled with the strong increase in GDP, led to an energy intensity improvement of more than 35 percent between 1990 and 2006.
- Increasingly, construction companies are incorporating energy-saving techniques in their building projects. Certification programs such as the Building Owners and Managers Association's Go Green and Go Green Plus or the Leadership in Environmental and Energy Design rating system are becoming more prevalent on Canadian construction sites.
- The industry is investigating how to accelerate fleet turnovers in order to further reduce carbon dioxide emissions and realize greater energy efficiencies because more stringent engine emission standards come into effect for diesel-powered off-road engines in 2009.

### Construction Sector – NAICS 23

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

— Energy Intensity Index

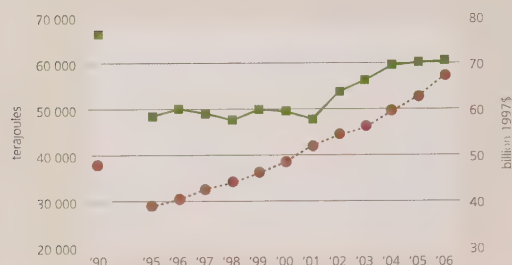


Data source:  
Energy Use – Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC). Development of Energy Intensity Indicators for Canadian Industry 1990–2006. Simon Fraser University, March 2008.  
Production – Informetrica Limited, T1 Model and National Reference Forecast, November 2007.

### Construction Sector – NAICS 23

Total Energy and Economic Output (1990–2006)

— Total Energy (HHV) • GDP

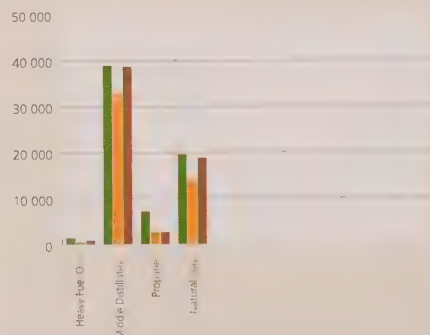


Data source:  
Energy Use – Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC). Development of Energy Intensity Indicators for Canadian Industry 1990–2006. Simon Fraser University, March 2008.  
Production – Informetrica Limited, T1 Model and National Reference Forecast, November 2007.

### Construction Sector – NAICS 23

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



Data source:  
Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC). Development of Energy Intensity Indicators for Canadian Industry 1990–2006. Simon Fraser University, March 2008.



## SECTOR REPORTS

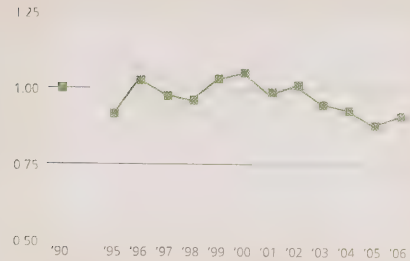
## Dairy

## Dairy Sector – NAICS 3115

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

■ Energy Intensity Index

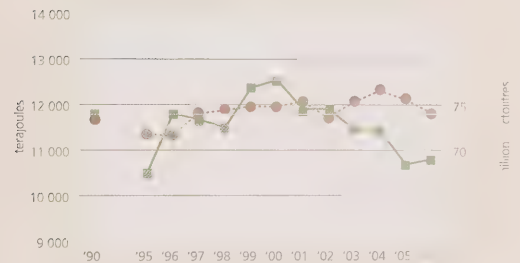


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey,  
Ottawa, December 2007  
Production – Stats Ca  
and Stats Can Report

## Dairy Sector – NAICS 3115

Total Energy and Production Output (1990–2006)

■ Total Energy (HHV) ● Production

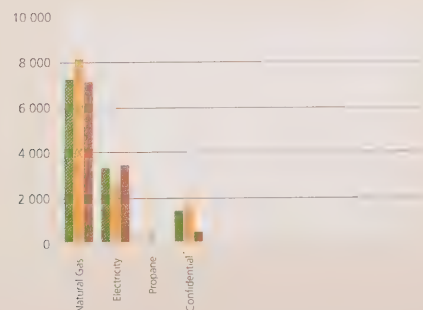


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey,  
Ottawa, December 2007  
Production – Stats Can Report 23-001, The Dairy Review, August 2006  
and Stats Can Report 23-014

## Dairy Sector – NAICS 3115

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



\*Confidential includes Heavy Fuel Oil (HFO) and Middle Distillates (LFO)

Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey,  
Ottawa, December 2007

## Highlights

- Canada's dairies processed 74.3 million hectolitres of milk and cream in 2006, 1.2 percent more than in 1990.
- Between 1990 and 2006, the sector's energy intensity decreased 9.3 percent.
- In 2006, 13.1 percent less energy was used to process a hectolitre of milk and cream, compared to 2000.

## Electrical and Electronics

**Profile** The electrical and electronics sector includes companies that produce electrical appliances, lighting, consumer electronics, communications and electronic equipment, cabling, office equipment, industrial equipment and other electrical products. The industry is a major exporter and a growing contributor to the national economy.

### Highlights

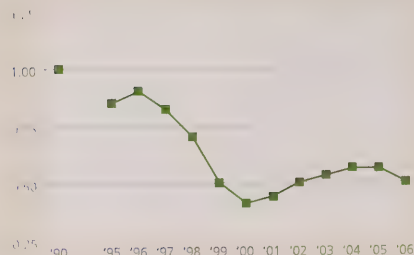
- In 2006, the industry consumed 11 767 TJ of energy, which is an 8.8 percent decrease from 2005.
- Between 1990 and the end of 2006, the sector's overall energy consumption decreased 11.1 percent, despite substantial growth in the GDP.
- These factors led to an energy intensity improvement of 48 percent over the period.
- Since 2000, energy consumption has followed GDP trends fairly closely, showing a recovery from a down turn in the sector in 2001.
- While energy intensity rose between 2000 and 2005, it decreased 9 percent between 2005 and 2006.

### Electrical and Electronics Sector – NAICS 334, 335

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

— Energy Intensity Index



Data source:

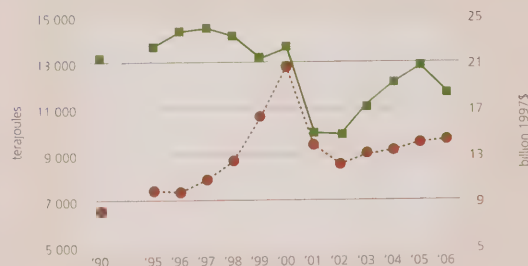
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey  
Ottawa, December 2007

Production – Informetrica Limited, T1 Model and National Reference Forecast  
November 2007

### Electrical and Electronics Sector – NAICS 334, 335

Total Energy and Economic Output (1990–2006)

— Total Energy (HHV) — GDP



Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey  
Ottawa, December 2007

Production – Informetrica Limited, T1 Model and National Reference Forecast  
November 2007

### Electrical and Electronics Sector – NAICS 334, 335

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



\* Confidential includes Middle Distillates (LFO), Propane (LPG) and Wood Waste

Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey  
Ottawa, December 2007

## SECTOR REPORTS

 Electricity  
Generation

Profile: Electricity is a major sector of the Canadian economy, accounting for approximately 10 percent of the country's gross domestic product (GDP). It is a key input for many other sectors, and there is a large base of industrial and utility users. Canadians use electricity generated by hydroelectric, fossil fuel, nuclear, wind, and solar power. The industrial and utility sectors are the largest consumers of electricity.

## Highlights

- The electricity generation sector (utilities only) used hydropower, nuclear, fossil fuels, including coal and natural gas, and alternative and emerging generation such as biomass, wind, and solar power to produce 538 terawatt hours (TWh) of electricity in 2006.
- Electricity generation has increased 26.3 percent since 1990.
- Over the same period, energy intensity increased 5.7 percent.
- Hydroelectricity accounts for the largest supply source for electricity – nearly 60 percent.
- Between 1990 and 2006, total GHG intensity increased 4.6 percent, and GHG intensity for fossil fuel generation decreased by 2 percent.

 Electrical Generation – Utility Generation only\*  
NAICS 22111

Utility Generation Source:

■ Energy Intensity ■ Electricity Generation

1990 = 100



\* This sector excludes industrial electricity generation

Data source:

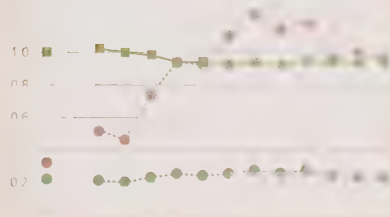
 Electrical Generation – Utility Generation only\*  
NAICS 22111

Utility Generation Source:

■ GHG Intensity Fossil Generation ■ GHG Intensity All Generation

■ TOTAL GHG Emissions for Utility Generation

1990 = 100



\* This sector excludes industrial electricity generation

Data source:

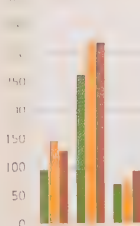
1990 = 100

 Electrical Generation – Utility Generation only\*  
NAICS 22111

Utility Generation Source:

■ 1990 ■ 2000 ■ 2006

1990 = 100



\* This sector excludes industrial electricity generation.

Data source:

Canadian Industrial Energy End-Use Survey (CIEES) and IEDAC

1990 = 100



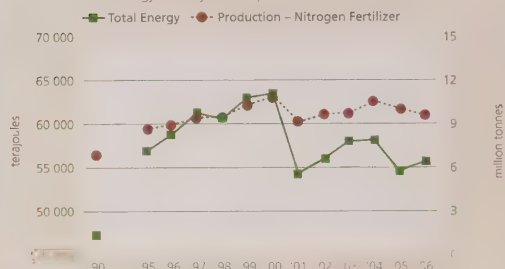


## Highlights

- The Canadian fertilizer sector ranks among the lowest GHG emitters per unit of fertilizer output in the world.
- Gross nitrogen fertilizer production increased from 6.8 million t in 1990 to 9.5 million t in 2006.
- Natural gas and other fuel sources used for production of nitrogenous fertilizer totalled 55 698 TJ in 2006 compared with 47 186 TJ in 1990. This is an improvement in energy intensity of approximately 15.2 percent.
- The energy intensity of nitrogen fertilizers was 5.87 in 2006, up from 5.48 in 2005. This change is the result of a relative decrease in the production of less energy-intensive products (urea and ammonium nitrate) and an increase in the production of more energy-intensive products, such as ammonia.
- The potash production level in 2006 was 8.3 million t, which is an increase of 18.7 percent since 1990.
- For potash production, energy intensity improved by an average of more than 1 percent annually since 1990.
- Between 2005 and 2006, potash production decreased 22 percent and the energy-intensity index for potash production increased 20 percent.

### Nitrogenous Fertilizer Sector – NAICS 325313

Total Energy and Physical Output

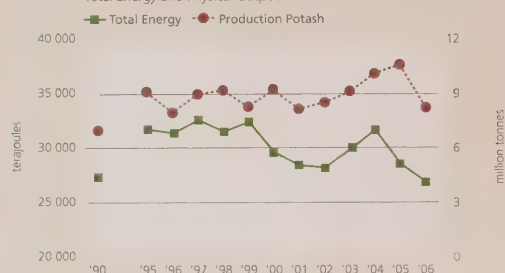


Data source:

Canadian Fertilizer Institute (CFI), 1995-1998, March 2006

### Potash Mines Sector – NAICS 212396

Total Energy and Physical Output

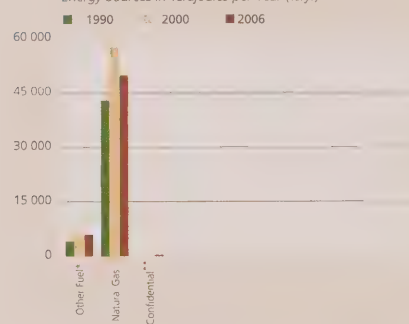


Data source:

Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity Indicators for Canadian Industry 1990-2006, Simon Fraser University, March 2007

### Nitrogenous Fertilizer Sector – NAICS 325313

Energy Sources in Terajoules per Year (TJ/yr)



\*Other fuel includes Electricity, LFO (Middle Distillates) and LPG (Propane)

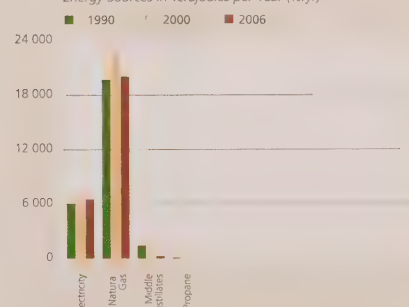
\*\*Confidential\*\* includes HFO (heavy fuel oil) and Steam

Data source:

Natural Gas – 1990, 1999-2006, Canadian Fertilizer Institute, November 2007  
Natural Gas – 1995-1998, Canadian Fertilizer Institute, March 2006  
Other Fuel – 1990-2005, Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity Indicators for Canadian Industry 1990-2006, Simon Fraser University, March 2007

### Potash Mines Sector – NAICS 212396

Energy Sources in Terajoules per Year (TJ/yr)



Data source:

Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity Indicators for Canadian Industry 1990-2006, Simon Fraser University, March 2007

SECTOR REPORTS

Food and Beverage



Profile: Canada's food and beverage processors include manufacturers that produce meat, poultry, fish, dairy, vegetable, fruit and baked products, as well as snack foods, soft drinks and confections.

Highlights

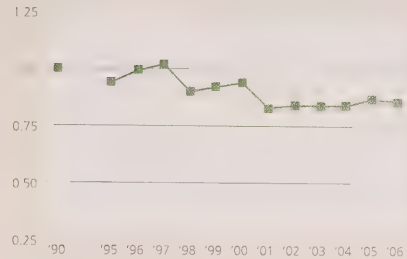
- Canada's food processing industry increased its GDP by 30.8 percent from 1990 to 2006.
- The sector's energy consumption decreased 107 124 TJ in 2006 from 107 450 TJ in 2005.
- Over the past 16 years, the sector's energy consumption increased 12.8 percent. The increase was caused by a 35 percent increase in electricity consumption.
- From 1990 to 2006, food processors decreased their collective energy intensity by 13 percent.

Food and Beverage Sector – NAICS 311, 3121

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

■ Energy Intensity Index

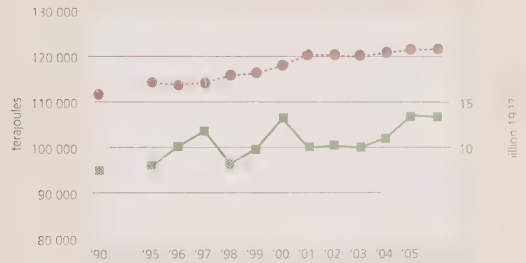


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey,  
Ottawa, December 2007  
Production – Informetrica Limited, T1 Model and National Reference Forecast,  
November 2007

Food and Beverage Sector – NAICS 311, 3121

Total Energy and Economic Output (1990–2006)

■ Total Energy (HHV) ● GDP

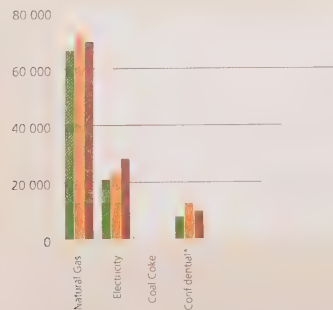


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey,  
Ottawa, December 2007  
Production – Informetrica Limited, T1 Model and National Reference Forecast,  
November 2007

Food and Beverage Sector – NAICS 311, 3121

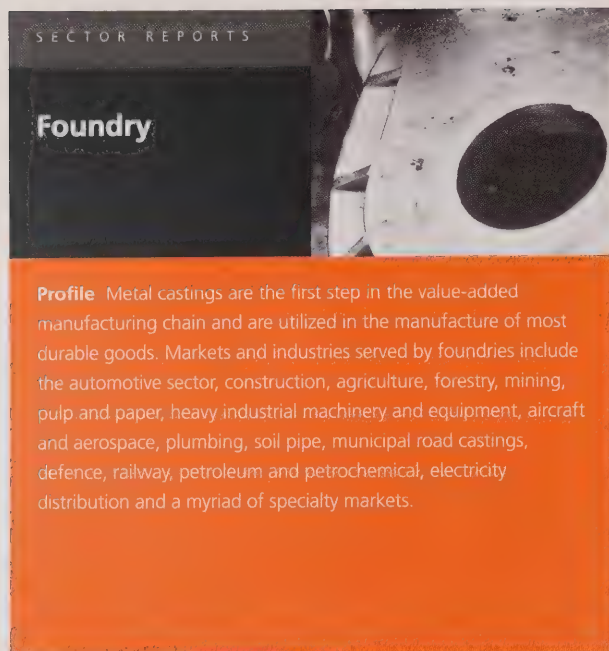
Energy Sources in TeraJoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



\*Confidential includes Heavy Fuel Oil, Middle Distillates (LFO), Propane (LPG), Wood Waste and Steam

Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey,  
Ottawa, December 2007



## Highlights

- Canada's foundries no longer use GHG-generating fuels such as coal in their operations, and they have eliminated the use of steam produced by coal-generated electricity.
- Escalating oil, natural gas and power costs as well as a rising Canadian dollar are motivating companies to undertake energy efficiency activities such as installing more efficient equipment, adopting better production methods, fuel switching and establishing waste-energy capture programs.
- An energy efficiency networking group for the sector was founded in the summer of 2004 and uses Web conferencing to connect foundries from Quebec, Ontario and western Canada.
- The GDP in the foundry sector decreased only 0.9 percent between 2001 and 2006, and the energy use decreased 2.3 percent. These changes indicate that the industry continues to drive energy efficiencies.
- In 2006 (similar to 2005), increased natural gas use partially displaced the more expensive electricity as a fuel commodity. Natural gas use increased 2.8 percent between 2005 and 2006, and electricity consumption decreased 7 percent.
- The leaders in the foundry sector are looking at further reducing energy consumption.

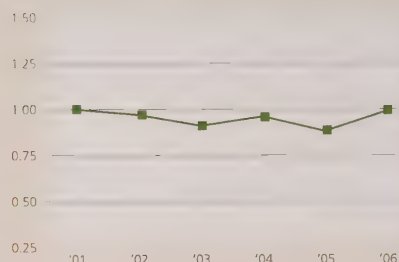
Note: 2004 and 2005 data are subject to verification.

### Foundry Sector – NAICS 3315

Energy Intensity Index (2001–2006)

Base Year 2001 = 1.00

■ Energy Intensity Index

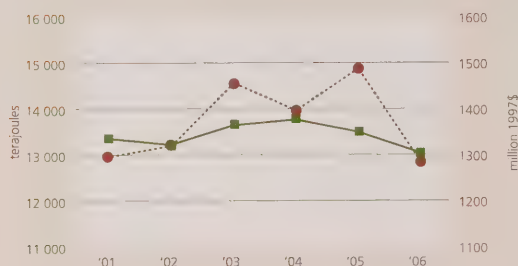


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990, 1995–2006 (Ottawa, December 2007)  
Production – Informeteca Limited, T1 Model and National Reference Forecast, November 2007

### Foundry Sector – NAICS 3315

Total Energy and Economic Output (2001–2006)

■ Total Energy (HHV) ● GDP

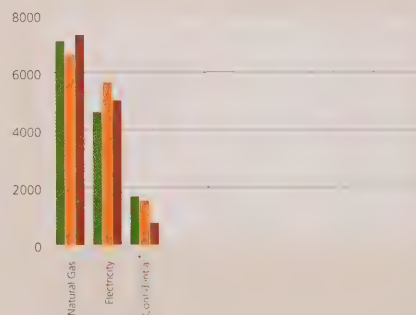


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990, 1995–2006 (Ottawa, December 2007)  
Production – Informeteca Limited, T1 Model and National Reference Forecast, November 2007

### Foundry Sector – NAICS 3315

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



\*Confidential includes Coal Coke, Heavy Fuel Oil (HFO), Middle Distillates (LFO) and Propane (LPG)

Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990, 1995–2006 (Ottawa, December 2007)



## SECTOR REPORTS

## General Manufacturing

**Profile** The general manufacturing sector comprises a variety of industries, including leather, clothing, furniture, printing activities, construction materials, floor coverings, insulation, glass and glass products, adhesives, and pharmaceuticals. The sector employed approximately 2000 small, medium-sized and large companies.

## Highlights

- The general manufacturing sector's production (GDP 1997\$) increased 39.8 percent between 1990 and 2006.
- Energy intensity decreased 36.5 percent over the same period.
- Companies included in the general manufacturing sector consumed 163 788 TJ of energy in 2006, a decrease of 9 percent compared to 2005.
- The energy intensity index in the general manufacturing sector improved 10 percent in 2006 over 2005.

## NAICS Category Name

Leather & Allied Product NAICS 316  
 Clothing & Manufacturing NAICS 315  
 Furniture & Related Product NAICS 337  
 Printing & Related Support Activities NAICS 323  
 Fabricated Metal Product NAICS 332  
 Machinery NAICS 333  
 Non-metallic Mineral Product not Elsewhere Classified NAICS 3271, 3272, 32732, 32733, 32739, 3274, 32742, 3279  
 Miscellaneous Manufacturing NAICS 339  
 Chemical Manufacturing not Elsewhere Classified NAICS 32522, 325314, 32532, 3254, 3255, 3256, 3259  
 Tobacco Product Manufacturing NAICS 3122  
 Converted Paper Product Manufacturing NAICS 3222

Note: Because plastic products is now a separate sector, it is NO LONGER included in general manufacturing, unlike previous years.

## General Manufacturing Sector – NAICS\*

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

— Energy Intensity Index



Data source:

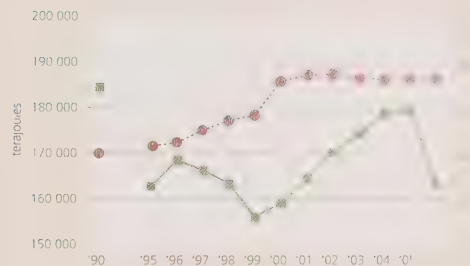
Energy Intensity Index – Statistics Canada, Industrial Consumption of Energy Survey, February 2007  
 GDP – Statistics Canada, National Accounts, November 2007

\*Confidential includes Coal, Coke, Petroleum Coke, Heavy Fuel Oil (HFO), Middle Distillates (LFO), Propane (LPG), Wood Waste, Steam, Natural Gas and Electricity

## General Manufacturing Sector – NAICS\*

Total Energy and Economic Output (1990–2006)

— Total Energy (HHV) — GDP



Data source:

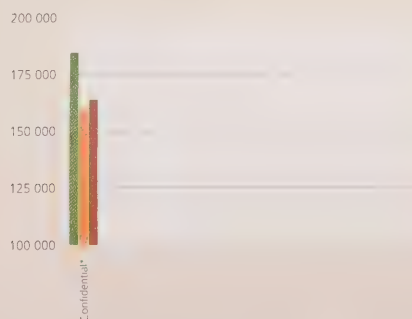
Energy Intensity Index – Statistics Canada, Industrial Consumption of Energy Survey, February 2007  
 GDP – Statistics Canada, National Accounts, November 2007

\*Confidential includes Coal, Coke, Petroleum Coke, Heavy Fuel Oil (HFO), Middle Distillates (LFO), Propane (LPG), Wood Waste, Steam, Natural Gas and Electricity

## General Manufacturing Sector – NAICS\*

Energy Sources in Terajoules per Year (TJ/yr)

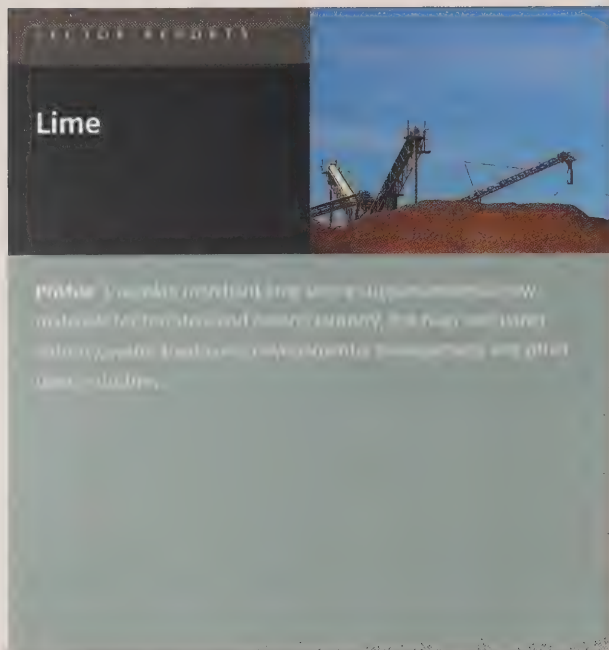
■ 1990 ■ 2000 ■ 2006



\*Confidential includes Coal, Coke, Petroleum Coke, Heavy Fuel Oil (HFO), Middle Distillates (LFO), Propane (LPG), Wood Waste, Steam, Natural Gas and Electricity

Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, Ottawa December 2007



## Highlights

- According to energy data available in 2006, it took 14 742 TJ of energy to produce 2103 kilotonnes of lime.
- Lime sector production rose 13.8 percent between 1990 and 2006, while total energy consumed decreased 5 percent.
- Energy intensity in 2006 decreased by 4.4 percent compared to 2005 and 16.6 percent compared to 1990.

### Lime Sector – NAICS 327410

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

■ Energy Intensity Index



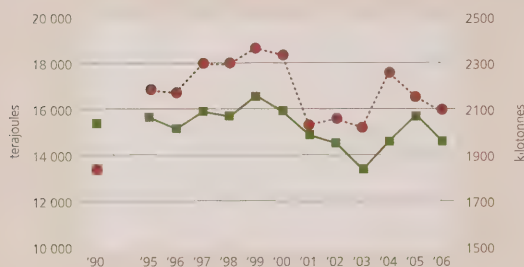
Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey 1990, 1995–2006 Ottawa December 2007  
 Production – Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity Indicators for Canadian Industry 1990–2006 Simon Fraser University October 2007

### Lime Sector – NAICS 327410

Total Energy and Physical Output (1990–2006)

■ Total Energy (HHV) ● Lime Production



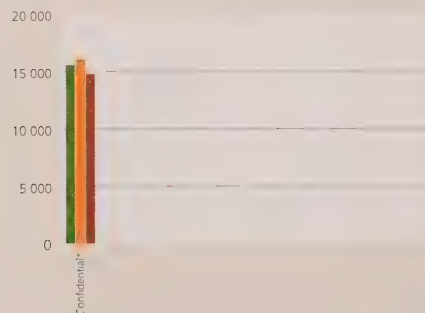
Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey 1990, 1995–2006 Ottawa December 2007  
 Production – Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity Indicators for Canadian Industry 1990–2006 Simon Fraser University October 2007

### Lime Sector – NAICS 327410

Energy Sources in TeraJoules per Year (TJ/yr)

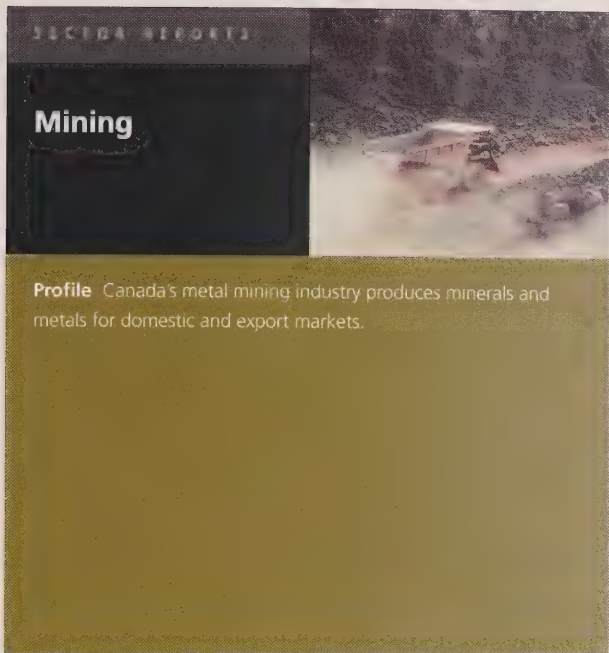
■ 1990 ■ 2000 ■ 2006



\* Confidential includes HFO (Heavy Fuel Oil), LFO (Middle Distillates), LPG (Propane), Coal Coke, Petroleum Coke, Coal, Electricity and Natural Gas

Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey 1990, 1995–2006 Ottawa December 2007



**Profile** Canada's metal mining industry produces minerals and metals for domestic and export markets.

## Highlights

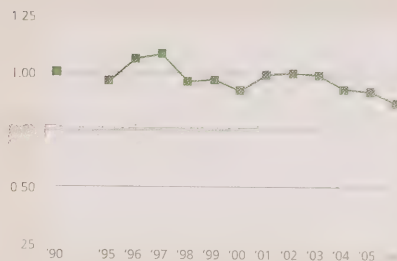
- Canadian metal ore production decreased from 282 million t in 1990 to 242 million t in 2006, which is a decrease of 14.2 percent.
- Energy consumption decreased 25.3 percent over the same period, which caused an improvement in energy intensity of 13 percent.
- MAC is presently updating the energy and GHG management document that encourages strong company performance under the industry's Towards Sustainable Mining initiative.

### Metal Mining Sector – NAICS 2122

Energy Intensity Index 1990–2006

Base Year 1990 = 1.00

■ Energy Intensity Index



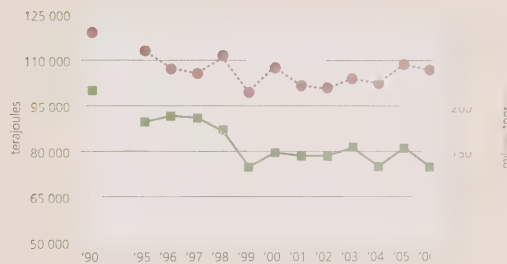
Data source:

Energy Intensity: Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity Indicators for Canadian Industry 1990–2006. Simon Fraser University, January 2008.

### Metal Mining Sector – NAICS 2122

Total Energy and Economic Output (1990–2006)

■ Total Energy (HHV) ● Production



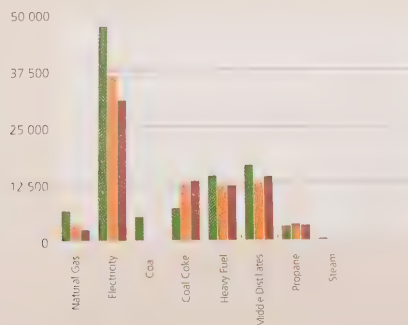
Data source:

Energy Intensity: Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity Indicators for Canadian Industry 1990–2006. Simon Fraser University, January 2008.

### Metal Mining Sector – NAICS 2122

Energy Sources in Terajoules per Year (TJ/yr)

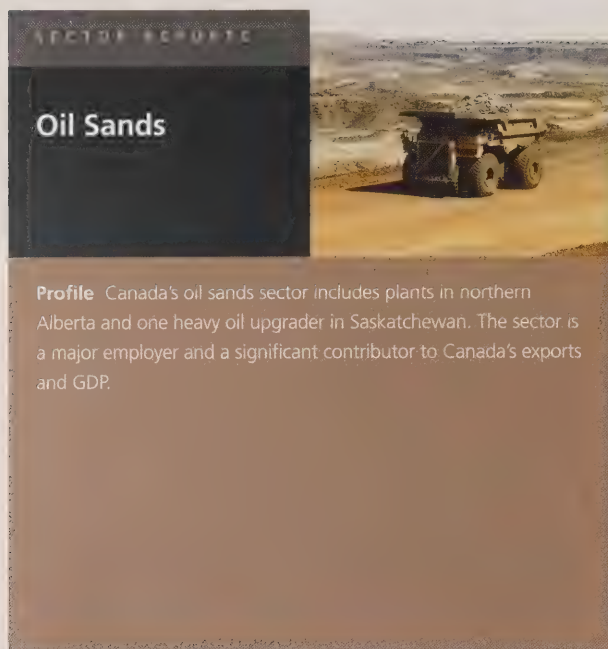
■ 1990 ■ 2000 ■ 2006



Data source:

Energy Use – Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity Indicators for Canadian Industry 1990–2006. Simon Fraser University, January 2008.





**Profile** Canada's oil sands sector includes plants in northern Alberta and one heavy oil upgrader in Saskatchewan. The sector is a major employer and a significant contributor to Canada's exports and GDP.

## Highlights

- The sector's energy intensity improved 24.1 percent since 1995, which is an average annual improvement of 2 percent. There was a 134 percent increase in production and a 78 percent increase in energy use.
- The sector's move toward energy self-sufficiency is illustrated by the following statistics:
  - Since 1995, bitumen production has become a larger share compared with the upgraded product.
  - The sector relies heavily on process gas and natural gas, which comprised 29.5 and 45.2 percent, respectively, of the energy consumed in 2006.

### Oil Sands Sector – NAICS 211114

Energy Intensity Index (1995–2006)

Base Year 1995 = 1.00

■ Energy Intensity Index

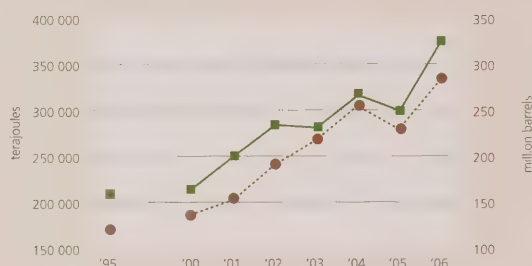


Data source:  
Alberta Energy and Utilities Board 2008 (Fort McMurray office)

### Oil Sands Sector – NAICS 211114

Total Energy and Production Output (1995–2006)

■ Total Energy (HHV) ● Production

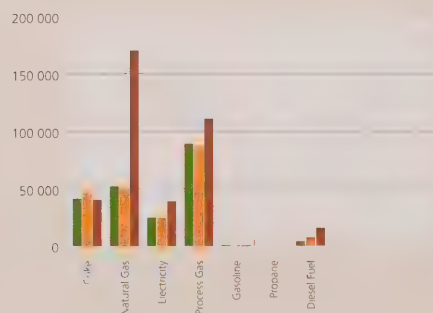


Data source:  
Alberta Energy and Utilities Board 2008 (Fort McMurray office)

### Oil Sands Sector – NAICS 211114

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



Data source:  
Alberta Energy and Utilities Board 2008 (Fort McMurray office)

## SECTOR REPORT

# Petroleum Products

**Profile** Canada's petroleum products sector markets gasoline, diesel, heating oil, jet fuels, lubricating oil and other related products through a network of approximately 15 000 wholesale and retail outlets.

## Highlights

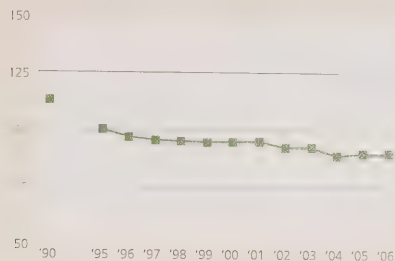
- In 2006, the petroleum products sector's energy consumption – using lower heating values (LHV) – remained virtually the same compared to 1990 and production increased by 17.4 percent.
- The energy intensity for the sector improved 20.4 percent since 1990.

## Petroleum Products Sector – NAICS 324110

Solomon Energy Intensity Index\* (1990–2006)

Base Year 1990 = 112.6

—■— Solomon Energy Intensity Index



\* Intensity of production generated by Solomon Associates is not based on the energy and production data displayed in the Total Energy and Production chart

Data source:

Review of Energy Consumption in

Canada, 1990–2006

Prepared for the Canadian Petroleum Products Institute (CPPI) and Canadian Industry

Program for Energy Conservation by Jørn Nyboer, Canadian Industrial

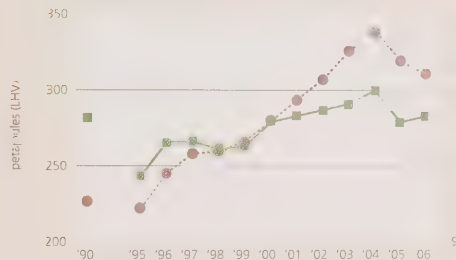
End Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity

Indicators for Canadian Industry 1990–2006, Simon Fraser University, March 2008

## Petroleum Products Sector – NAICS 324110

Total Energy and Production

—■— Total Energy (HHV) —●— Production



Data source:

Review of Energy Consumption in

Canada, 1990–2006

Prepared for the Canadian Petroleum Products Institute (CPPI) and Canadian Industry

Program for Energy Conservation by Jørn Nyboer, Canadian Industrial

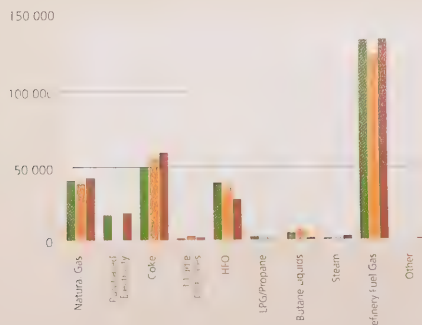
End Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity

Indicators for Canadian Industry 1990–2006, Simon Fraser University, March 2008

## Petroleum Products Sector – NAICS 324110

Energy Sources in Terajoules per Year (TJ/yr) (LHV)

■ 1990 ■ 2000 ■ 2006



Data source:

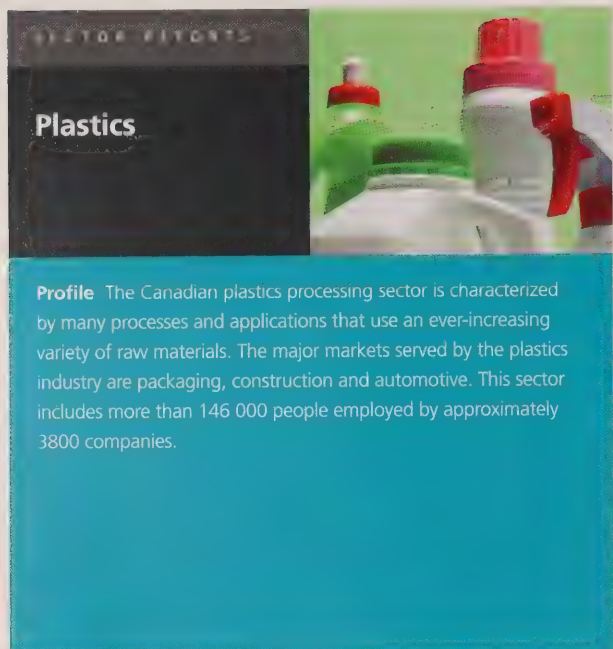
Review of Energy Consumption in Canadian Oil Refineries: 1990, 1994 to 2006

Prepared for the Canadian Petroleum Products Institute (CPPI) and Canadian Industry

Program for Energy Conservation by Jørn Nyboer, Canadian Industrial

End Use Data and Analysis Centre (CIEEDAC), Development of Energy Intensity

Indicators for Canadian Industry 1990–2006, Simon Fraser University, March 2008



**Profile** The Canadian plastics processing sector is characterized by many processes and applications that use an ever-increasing variety of raw materials. The major markets served by the plastics industry are packaging, construction and automotive. This sector includes more than 146 000 people employed by approximately 3800 companies.

## Highlights

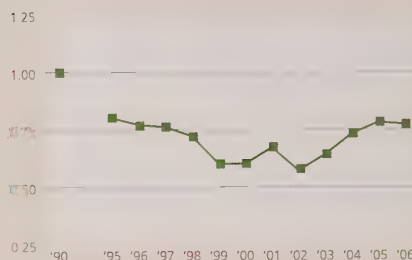
- In 2006, the GDP in the plastics sector doubled compared to 1990, and the energy use increased only 61 percent during the same period.
- These above two factors led to an improvement in energy intensity of 23.1 percent over the same period.
- Natural gas and electricity account for almost all of the energy used in the plastics sector, representing 96.1 percent of energy consumed in 2006.

### Plastics Sector – NAICS 3261

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

■ Energy Intensity Index



Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey

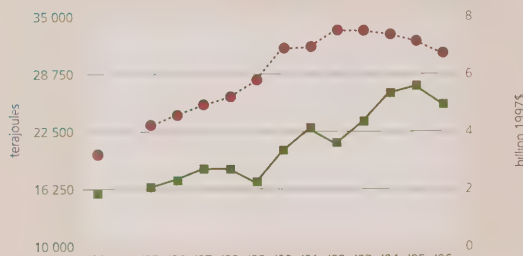
1990, 1995–2006 Ottawa: December 2007

Production – GDP – Informetrica Limited, T1 Model Database and National Reference Forecast, November 2007

### Plastics Sector – NAICS 3261

Total Energy and Economic Output (1990–2006)

■ Total Energy (HHV) ● GDP



Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey

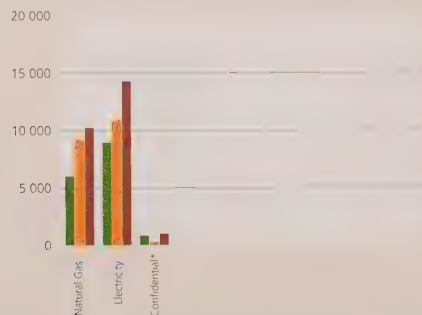
1990, 1995–2006 Ottawa: December 2007

Production – GDP – Informetrica Limited, T1 Model Database and National Reference Forecast, November 2007

### Plastics Sector – NAICS 3261

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



\* Confidential includes Heavy Fuel Oil (HFO), Middle Distillates (LFO), Propane (LPG) and Steam

Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey 1990, 1995–2006 Ottawa: December 2007



## SECTOR HIGHLIGHTS

## Pulp and Paper

**Profile** Pulp and paper, a key component of the forest products industry, is a major contributor to Canada's economy. In addition to market pulp, the sector produces newsprint, specialty papers, paperboard, building board and other paper products. It is the largest industrial energy consumer, representing 25 percent of industrial energy consumption in Canada.

## Highlights

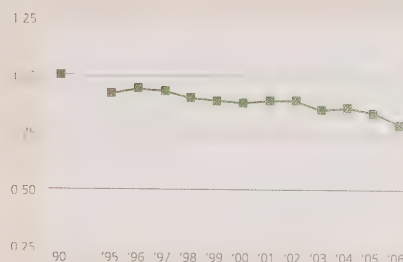
- Pulp and paper is Canada's leading industrial user of renewable energy. Biomass and small hydro power comprise 59 percent of the sector's energy consumption.
- Under continued pressure from the appreciation of the Canadian dollar, weak North American markets (particularly newsprint) and low product prices, companies rationalized production and undertook productivity improvements.
- The industry's strategy of substituting biomass for fossil fuels and adopting more self-generation is key to the industry's success in controlling higher energy costs.
- Between 1990 and 2006, sector companies increased their production by 27.2 percent and energy use increased less than 1 percent.
- The sector's energy intensity improved 20.8 percent over the same period, meeting the industry's target of 1 percent annual improvement.

## Pulp and Paper Sector – NAICS 3221

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

— Energy Intensity Index



Data source:

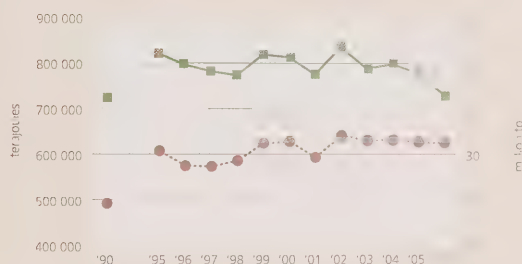
Forest Products Association of Canada's Energy Monitoring Report, 1990–2006

Table 10.10

## Pulp and Paper Sector – NAICS 3221

Total Energy and Physical Output (1990–2006)

— Total Energy (HHV) — Pulp and Paper Production



Data source:

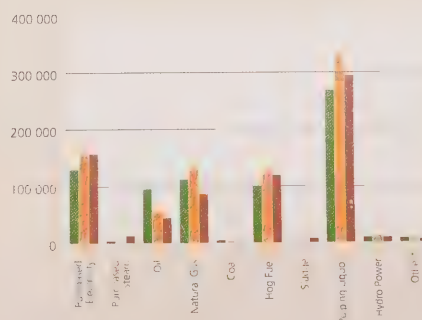
Forest Products Association of Canada's Energy Monitoring Report, 1990–2006

Table 10.10

## Pulp and Paper Sector – NAICS 3221

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



\*Other includes Distillates, Diesel, LPG, Other Purchased Energy and Other Self-generated Energy

Data source:

Forest Products Association of Canada's Energy Monitoring Report, 1990–2006  
May 2008

## SECTOR REPORTS

## Rubber

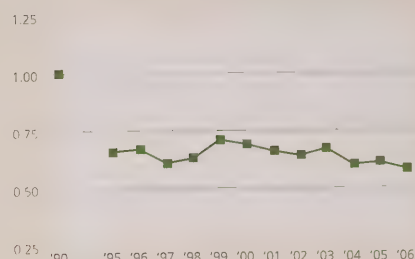
**Profile** The rubber products industry is a major contributor to the Canadian economy. It represents approximately \$6 billion in shipments and employs approximately 25 700 people. The industry is also very active in international trade with imports of \$4.2 billion and exports of \$3.4 billion.

## Rubber Sector – NAICS 3262

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

— Energy Intensity Index



Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990, 1995–2006, Ottawa, December 2007  
Production – GDP – Informetrica Limited, T1 Model and National Reference Forecast, November 2007

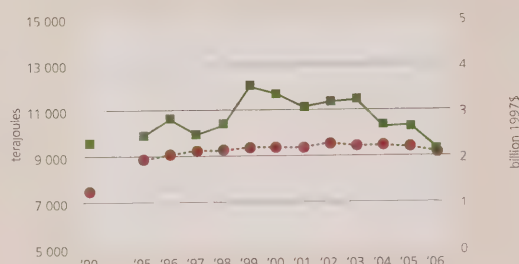
## Highlights

- In 2006, the sector consumed 9427 TJ of energy, a decrease of 2.3 percent compared to 1990.
- Over the same period, production increased 69.3 percent, leading to an overall improvement in energy intensity of 42.2 percent.
- Natural gas and electricity represent more than 83 percent of the sector's energy consumption.

## Rubber Sector – NAICS 3262

Total Energy and Economic Output (1990–2006)

— Total Energy (HHV) • GDP

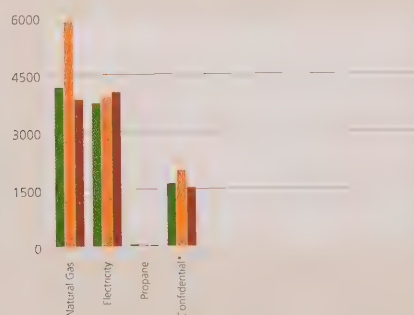


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990, 1995–2006, Ottawa, December 2007  
Production – GDP – Informetrica Limited, T1 Model and National Reference Forecast, November 2007

## Rubber Sector – NAICS 3262

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



\*Confidential includes Heavy Fuel Oil (HFO) and Middle Distillates (LFO)

Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990, 1995–2006, Ottawa, December 2007

## SECTOR REPORT

## Steel

**Profile** Canada's steel sector is one of the country's major industries. The industry employs more than 30 000 Canadians. The sector produces more than 15 million t of steel annually, supplying flat-rolled (sheet and plate), long (re-bar and structural steel) and specialty and alloy (stainless and tool steels) products for markets in the automotive, appliance, oil and gas, machinery, construction and packaging industries.

## Highlights

- Steel industry output increased almost 15.5 percent between 1990 and 2006.
- Over the same period, the sector lowered its energy intensity 25 percent.
- The sector's production increased slightly in 2006 compared to 2005 (3.3 percent) and energy consumed decreased 1.9 percent, due mainly to decreases in the consumption of natural gas and electricity. This led to a 5.1 percent decrease in energy intensity between 2005 and 2006.

## Steel Sector – NAICS 331100

Energy Intensity Index (1990–2006)

Base Year 1990 (adjusted) = 1.00

■ 1990 Adjusted □ 1990 Actual



Data source:  
1990 Adjustments for Energy, Shipments & Intensity  
Manufacturing Energy Intensity  
Centre (CIEEDAC) March  
Intensities 1991–2005

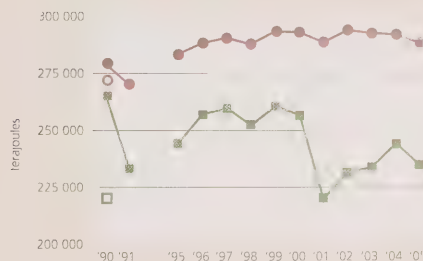
2006 Intensity

Coke 2006

## Steel Sector – NAICS 331100

Total Energy and Physical Output (1990–2006)

■ Total Energy □ 1990 Actual ● Shipments ○ 1990 Actual



Data source:

Coal

Coke

Electricity

Energy Intensity Indicators NAIP

Shipments

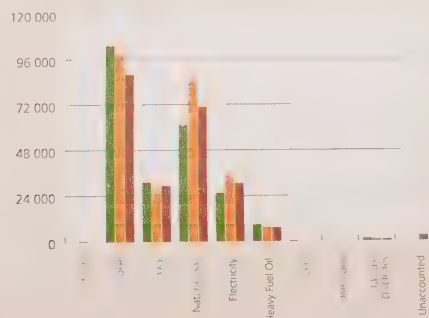
Primary iron &amp; steel

1990 Adjustments for Energy &amp; Shipments

## Steel Sector – NAICS 331100

Energy Sources in Terajoules per Year (TJ/yr)

■ 1991 ■ 2000 ■ 2006

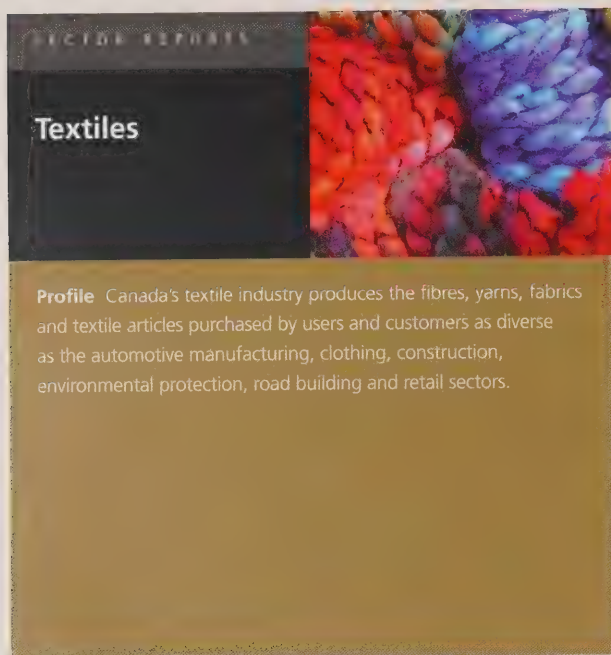


Data source:

Energy

Coke 2006: Coal &amp; Coke Statistics Catalogue 45-002-XPB; HFO 2006: Report on Energy Supply &amp; Demand, Catalogue 57-003-XOB; All others: CIEEDAC Energy Consumption and Energy Intensity Indicators NAICS 331100 accessed July 15, 2008





### Textiles Sector – NAICS 313, 314\*

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

— Energy Intensity Index

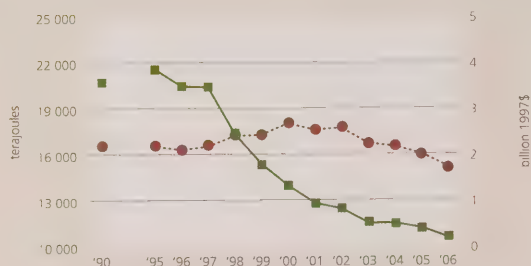


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990, 1995–2006. Ottawa, December 2007  
Production – GDP – Informetrica Limited, T1 Model and National Reference Forecast, November 2007

### Textiles Sector – NAICS 313, 314\*

Total Energy and Economic Output (1990–2006)

— Total Energy (HHV)    • GDP

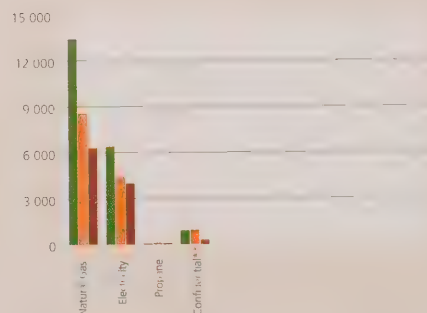


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, Ottawa, December 2007  
Production – GDP – Informetrica Limited, T1 Model and National Reference Forecast, November 2007

### Textiles Sector – NAICS 313, 314\*

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990    ■ 2000    ■ 2006



\*\* Confidential includes Heavy Fuel Oil (HFO), Middle Distillates (LFO) and Steam

Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990, 1995–2006. Ottawa, December 2007

## Highlights

- The textile industry improved its energy intensity by almost 34.3 percent between 1990 and 2006.
- The sector's energy use dropped 48.7 percent during the same period, and the industry's GDP decreased 22 percent.
- Following a major improvement between 1997 and 2002, energy intensity is increasing.
- The Textiles Sector Task Force maintains a target of reducing energy intensity by 1 percent each year through 2010.

- \* The new North American Industry Classification System (NAICS) classifies textile producers under Artificial and Synthetic Fibres/Filaments Manufacturing (NAICS 32522), Textile Mills (NAICS 313) and Textile Product Mills (NAICS 314). NAICS subgroup 32522 includes producers of synthetic fibres and filaments. NAICS Group 313 comprises establishments that are primarily engaged in manufacturing, finishing or processing yarn or fabrics. NAICS Group 314 includes establishments primarily engaged in manufacturing textile products (except clothing) such as carpets, household textiles, etc. Changes to the classification of industries by Statistics Canada from the Standard Industrial Classification (SIC) to NAICS mean that energy data for the synthetic fibre and filament yarn industries are no longer available separately. The statistics contained in this profile cover only NAICS Groups 313 and 314 as described previously.

## SECTOR REPORTS

# Transportation Equipment Manufacturing

**Profile** The Canadian transportation equipment manufacturing sector includes companies that manufacture aircraft, aircraft parts, automobiles, motor vehicle parts, trucks, buses, trailers, ships and railroad rolling stock.

## Highlights

- In 2006, the sector consumed 50 560 TJ of energy, which is a decrease of 1 percent from 1990.
- Over the same period, the sector's GDP increased 68.7 percent. The result was an improvement in energy intensity of 41.2 percent.
- The energy intensity of the transportation equipment manufacturing sector decreased 8.3 percent in 2006, relative to 2005.

## Transportation Sector – NAICS 336

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

— Energy Intensity Index

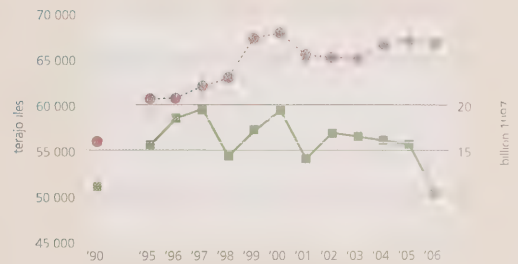


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990  
1995–2006, Ottawa, December 2007  
Production – GDP – Informatica Ltd. test, T1 Model and National Reference  
Forecast, November 2007

## Transportation Sector – NAICS 336

Total Energy and Economic Output (1990–2006)

— Total Energy (HHV) • GDP

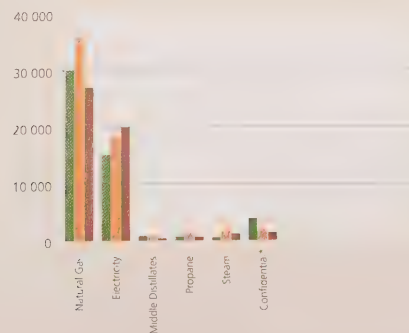


Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990  
1995–2006, Ottawa, December 2007  
Production – GDP – Informatica Limited, T1 Model and National Reference  
Forecast, November 2007

## Transportation Sector – NAICS 336

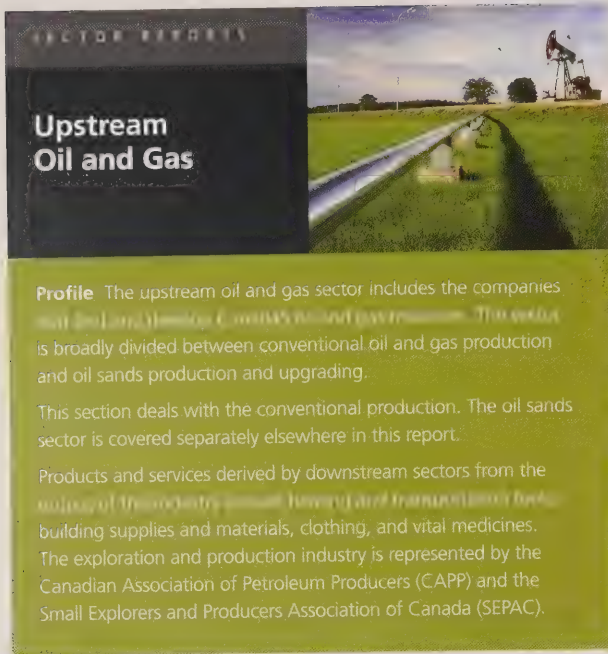
Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



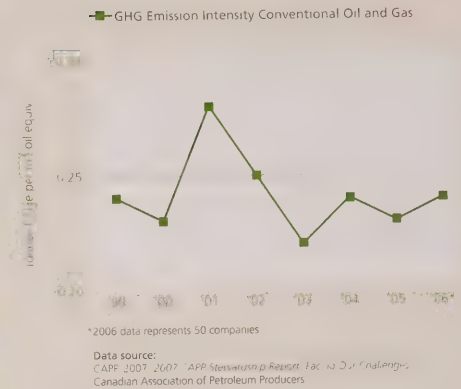
\*Confidential includes Coal, Coal Coke, Heavy Fuel Oil (HFO) and Wood

Data source:  
Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990,  
1995–2006, Ottawa, December 2007



### Upstream Oil and Gas Sector – NAICS 211113

GHG Intensity Index (1999–2006)



### Highlights

- Because of shifting mixes of production, limitations in data collection methodology and incomplete data, the Stewardship GHG emission data do not allow CAPP to provide useful analysis of trends in emission performance. CAPP is working to improve the collection of data and interpretation methods as one of its 2007–2009 priorities.



## SECTOR REPORT

# Wood Products

**Profile** The wood products sector is made up of 7000 facilities in primary and secondary manufacturing. The primary grouping includes commodity-based production facilities, such as lumber and structural panels, and more specialized production facilities, such as engineered wood products and wood floors.

The secondary grouping includes a diverse range of facilities that make prefabricated buildings, windows and doors, flooring mouldings, containers and pallets, other millwork, or a myriad of other products. The energy data presented here focus on the primary manufacturing grouping.

## Highlights

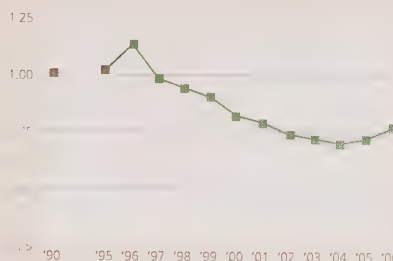
- Canada's wood products sector consumed 134 337 TJ of energy in 2006, including 70 476 TJ of biomass, which represents 52.5 percent energy self-sufficiency.
- Market conditions worsened in 2006 when United States (U.S.) housing starts decreased 12.5 percent from the 2005 peak. Lumber prices decreased 16 percent and OSB prices decreased 32 percent in U.S. dollar terms.
- The 6 percent appreciation in the Canadian dollar also made market conditions worse.
- The market conditions caused capacity rationalization. An increase in energy intensity suggests that the numerous partial mill curtailments resulted in less efficient use of energy. As a result, the sector's energy intensity increased 6.3 percent over 2005.
- Despite the setback in energy intensity in 2006, the sector's energy intensity improved 23.3 percent between 1990 and 2006. This level is above the sector's CIPEC target for annual improvement.

## Wood Products Sector – NAICS 321

Energy Intensity Index (1990–2006)

Base Year 1990 = 1.00

— Energy Intensity Index



Data source:

Energy Intensity Index

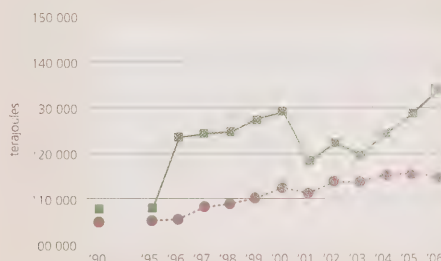
Production – NAICS 321

Forecast, November 2007

## Wood Products Sector – NAICS 321

Total Energy and Economic Output (1990–2006)

— Total Energy (HHV) — GDP



Data source:

Energy Intensity Index

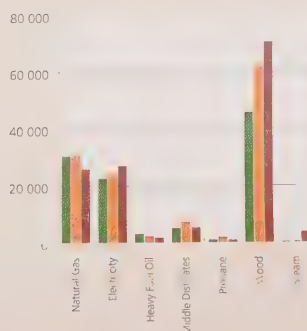
Production – GDP Index

Forecast, November 2007

## Wood Products Sector – NAICS 321

Energy Sources in Terajoules per Year (TJ/yr)

■ 1990 ■ 2000 ■ 2006



Data source:

Energy Use – Statistics Canada, Industrial Consumption of Energy Survey, 1990–2006

Ottawa, December 2007

# CIPEC Executive Board

## Glenn Mifflin

*Chair*  
CIPEC Executive Board  
*Vice-president and CFO*  
North Atlantic Refining Limited  
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# CIPEC Leader Companies by Sector

## Aluminum

Alcan Inc. – Montréal  
 Alcan Specialty Aluminas – Brockville  
 Alcoa Canada Première fusion – Montréal  
 Alcoa – Aluminerie de Baie-Comeau  
 – Baie-Comeau  
 Alcoa – Aluminerie Deschambault s.e.n.c.  
 – Deschambault  
 Alcoa – Usine de tige de Bécancour  
 – Bécancour  
 Alcoa – Aluminerie de Bécancour Inc.  
 – Bécancour  
 Almag Aluminum Inc. – Brampton  
 Alsa Aluminum Canada Inc. – Bécancour  
 Alumicor Limited – Toronto  
 Aluminerie Alouette Inc. – Sept-Îles  
 Indalex Limitée – Pointe-Claire  
 Recyclage d'aluminium Québec Inc. – Bécancour

## Brewery

Big Rock Brewery Ltd. – Calgary  
 John Allen Brewing Company (The) – Halifax  
 Labatt Breweries of Canada – Edmonton  
 La Brasserie Labatt – LaSalle  
 Les Brasseurs du Nord – Blainville  
 Molson Canada – Edmonton  
 Molson Canada – Ontario  
 Moosehead Breweries Limited  
 Pacific Western Brewing Company  
 Sleeman Brewing and Malting Co. Ltd.  
 Unibroue Inc. – Chambly  
 Westcan Malting Ltd. – Alix

## Cement

Advanced Precast Inc. – Bolton  
 Dufferin Concrete – Concord  
 ESSROC Canada Inc. – Picton  
 Gordon Shaw Concrete Products Ltd. – Windsor  
 Lafarge Canada Inc. – Montréal  
 Lehigh Inland Cement Limited – Edmonton  
 Lehigh Northwest Cement Limited  
 Pre-Con Inc. – Brampton  
 St. Lawrence Cement Inc.  
 St Marys Cement Corporation

## Chemicals

A. Schulman Canada Ltd. – St. Thomas  
 Abrex Paint & Chemical Ltd. – Oakville  
 Apotex Pharmachem Inc. – Brantford  
 Banner Pharmacaps (Canada) Ltd. – Olds  
 Bartek Ingredients Inc. – Stoney Creek  
 Benjamin Moore & Cie Limitée – Montréal  
 Big Quill Resources Inc. – Wynyard  
 BioVectra Inc. – Charlottetown  
 BOC Gaz – Magog  
 Brenntag Canada Inc. – Mississauga  
 Buther Engineering Enterprises  
 Limited (The) – Brampton  
 Celanese Canada Inc. – Boucherville  
 Church & Dwight Canada – Mount Royal

Colgate-Palmolive Canada Inc. – Mississauga  
 Collingwood Ethanol L.P. Ltd.  
 – Toronto  
 – Collingwood  
 Commercial Alcohol Inc.  
 – Chatham  
 – Tiverton  
 – Varennes  
 Dominion Colour Corporation  
 – Ajax  
 – Toronto  
 Dynea Canada Limited – North Bay  
 Dyno Nobel Nitrogen Inc. – Maitland  
 Eka Chimie Canada Inc.  
 – Valleyfield  
 – Magog  
 Estée Lauder Cosmetics Ltd. – Scarborough  
 Evonik Degussa Canada Inc.  
 – Brampton  
 – Burlington  
 – Gibbons  
 Fibrex Insulations Inc. – Sarnia  
 Galderma Production Canada Inc.  
 – Baie d'Urfé  
 Grace Canada Inc. – Valleyfield  
 Huntsman Corporation Canada Inc. – Guelph  
 ICI Canada Inc. – Concord  
 International Group (The) – Toronto  
 Jamieson Laboratories Ltd. – Windsor  
 Kronos Canada Inc. – Varennes  
 Nacan Products Limited – Brampton  
 NOVA Chemicals Corporation  
 – Calgary  
 – Corrua  
 – Joffre  
 – Moore Township  
 – St. Clair River  
 Oakside Chemicals Limited – London  
 Osmose-Pentox Inc. – Montréal  
 Oxy Vinyls Canada Inc. – Niagara Falls  
 Perth Soap Manufacturing Inc. – Perth  
 Pharmascience Inc. – Montréal  
 PolyOne Canada Inc.  
 – Niagara Falls  
 – Orangeville  
 PPG Canada Inc. – Beauharnois  
 Prolab Technologies Inc. – Thetford Mines  
 Purdue Pharma – Pickering  
 Reagens Canada Ltd. – Bradford  
 Rohm and Haas Canada Inc. – Scarborough  
 Saskatchewan Mineral – Chaplin  
 Tech Blend s.e.c. – Saint-Jean-sur-Richelieu

## Construction

AnMar Mechanical & Electrical  
 Contractors Ltd. – Lively  
 ATCO Structures Inc.  
 – Calgary  
 – Spruce Grove  
 Basin Contracting Limited – Enfield

Floating Pipeline Company Incorporated (The)  
 – Halifax  
 – Saint John  
 IKO Industries Ltd.  
 – Brampton  
 – Hawkesbury  
 Lockerbie & Hole Industrial Inc. – Edmonton  
 MJ Roofing & Supply Ltd. – Winnipeg  
 Mira Timber Frame Ltd. – Stoney Plain  
 Northland Building Supplies Ltd. – Edmonton  
 Poutrelles Delta Inc. – Sainte-Marie  
 Waiward Steel Fabricators Ltd. – Edmonton

## Dairy

Agrilait Cooperative agricole – Saint-Guillaume  
 Agropur Coopérative – Beauceville  
 Amalgamated Dairies Limited – Summerside  
 ADL O'Leary  
 ADL St. Eleanors  
 ADL West Royalty  
 O'Leary and Perfection Foods  
 Atwood Cheese Company – Atwood  
 Avalon Dairy Ltd. – Vancouver  
 Baskin-Robbins Ice Cream – Peterborough  
 Entreprise Le Mouton Blanc – La Pocatière  
 Farmers Co-Operative Dairy Limited – Halifax  
 Foothills Creamery Ltd.  
 – Calgary  
 – Edmonton  
 Hewitt's Dairy Limited – Hagersville  
 La Fromagerie Polyethnique – Saint-Robert  
 Laiterie Chagnon Ltée – Waterloo  
 Laiterie Charlevoix Inc. – Baie-Saint-Paul  
 Lone Pine Cheese Ltd. – Didsbury  
 Neilson Dairy Ltd.  
 – Georgetown  
 – Halton Hills  
 – Ottawa  
 Nutrinor (Laiterie Alma) – St-Bruno  
 Parmalat Dairy & Bakery Inc. – Etobicoke  
 Pine River Cheese & Butter  
 Co-operative – Ripley  
 Roman Cheese Products Limited  
 – Niagara Falls  
 Salerno Dairy Products Ltd. – Hamilton  
 Saputo Cheese, G.P. – Saint-Léonard  
 Silani Sweet Cheese Ltd. – Schomberg

## Electrical and Electronics

Alstom Hydro Canada Inc. – Sorel-Tracy  
 ASCO Valve Canada – Brantford  
 Best Theratronics Ltd. – Ottawa  
 BreconRidge Corporation – Ottawa  
 Broan-NuTone Canada – Mississauga  
 Candor Industries Inc. – Toronto  
 Century Circuits Inc. – Scarborough  
 Circuits GRM Enr. – Ville St-Laurent  
 Crest Circuits Inc. – Markham  
 Cogent Power Inc. – Burlington  
 Electrolux Canada Corp. – L'Assomption

EPM Global Services Inc. – Markham  
 Ferraz Shawmut Canada Inc. – Toronto  
 General Electric Canada – Peterborough  
 General Dynamics Canada  
 – Calgary  
 – Ottawa  
 GGI International – Lachine  
 Honeywell Limited – Mississauga  
 IBM Canada Limitée  
 MDS Nordion Inc. – Kanata  
 Milplex Circuits (Canada) Inc. – Scarborough  
 Nortel – Brampton  
 Osram Sylvania Ltd.  
 PC World – Scarborough  
 Pivotal Power Inc. – Bedford  
 S&C Electric Canada Limited – Toronto  
 Tyc Thermal Controls (Canada) Ltd. – Trenton  
 Vansco Electronics Ltd. – Winnipeg

## Electricity Generation

Ontario Power Generation

## Fertilizer

Agrium – Redwater  
 Mosaic Company (The)  
 – Regina  
 – Colonsay  
 – Esterhazy  
 Potash Corporation of Saskatchewan Inc.  
 Allan Division  
 Cory Division  
 Lanigan Division  
 New Brunswick Division  
 Patience Lake  
 Rocanville Division  
 Simplot Canada (II) Limited – Portage La Prairie

## Food and Beverage

A. Harvey & Company Limited – St. John's  
 Argentia Freezers – Dunville  
 Browning Harvey Limited – St. John's  
 Browning Harvey Limited – Corner Brook  
 Browning Harvey Limited – Grand Falls – Windsor  
 Abattoir Louis Lafrance & Fils Ltée  
 – St-Séverin de Proulxville  
 Abattoir Saint-Germain Inc.  
 – Saint-Germain-de-Grantham  
 ACA Co-operative Limited – Kentville  
 Eastern Protein Foods Limited – Kentville  
 AgEnezy Co-operative Inc. – Guelph  
 Agri-Marché Inc. – St-Isidore  
 Alberta Processing Co. – Calgary  
 Aliments Ouimet-Cordon Bleu Inc.  
 Aliments Reinhart Foods Limited/Ltée – Stayner  
 Aliments Ultima Foods Inc. – Granby  
 Andrés Wines Ltd. – Grimsby  
 Aljane Greenhouses Ltd. – Pitt Meadows  
 Alkema Greenhouses Ltd. – Grimsby  
 Andrew Hendriks and Sons  
 Greenhouses – Beamsville  
 Freeman Herbs – Beamsville

Andrew's Greenhouses Inc. – Ruthven  
 Antonio Bajar Greenhouses Limited – Newmarket  
 Beta Brands Limited – London  
 Black Velvet Distilling Company – Lethbridge  
 Boekestyn Greenhouses – Jordan Station  
 Bonduelle Canada Inc.  
 – Bedford  
 – Saint-Césaire  
 – Saint-Denis-sur-Richelieu  
 – Sainte-Martine  
 Bonduelle Ontario Inc.  
 – Ingersoll  
 – Stratroy  
 – Tecumseh  
 Border Line Feeders Inc. – Ceylon  
 Breakwater Fisheries Limited – Cottlesville  
 Brookdale Treeland Nurseries  
 – Niagara-on-the-Lake  
 Browning Harvey Limited  
 – St. John's  
 – Corner Brook  
 – Grand Falls – Windsor  
 Bunge Canada – Montréal  
 Burnbrae Farms Limited  
 – Lyn  
 – Mississauga  
 C & M Seeds – Palmerston  
 CadburyAdams Canada Inc. – Toronto  
 Café Vittoria Inc. – Sherbrooke  
 Campbell Company of Canada – Listowel  
 Canbra Foods Ltd. – Lethbridge  
 Canada Bread Company Ltd.  
 – Calgary  
 – Hamilton  
 – Scarborough  
 – Toronto  
 Cantor Bakery – Montréal  
 Canyon Creek Soup Company Ltd. – Edmonton  
 Cargill Animal Nutrition  
 – Camrose  
 – Lethbridge  
 Cargill Foods  
 – High River  
 – Toronto  
 Cargill Limited  
 – Winnipeg  
 – Sarnia  
 Cargill Aghorizons  
 – Melbourne  
 – Princeton  
 – Shetland  
 – Staples  
 – Stratroy  
 – Talbotville  
 – Brandon  
 – Dauphin  
 – Elm Creek  
 – Winnipeg  
 – Canora  
 – Nicklen Siding  
 – North Battleford  
 – Rosetown

– Albright  
 – Edmonton  
 – Lethbridge  
 – Rycroft  
 – Vegreville  
 Cargill Meat Solutions – Guelph  
 Casco Inc.  
 – Etobicoke  
 – Cardinal  
 – London  
 – Port Colborne  
 Cavendish Farms – New Annan  
 Cedar Field Greenhouses Ltd. – Freerton  
 Cedarline Greenhouses – Dresden  
 Champion Feed Services Ltd. – Barrhead  
 Champion Petfoods Ltd. – Morinville  
 Clearwater Seafoods Limited  
 Partnership – Bedford  
 Clearwater Lesters Ltd.  
 – Arichat  
 – Clark  
 Continental Seafoods – Shelburne  
 Grand Bank Seafoods – Grand Bank  
 Highland Fisheries – Glace Bay  
 Pierce Fisheries – Lockport  
 St. Anthony Seafoods Limited – Partnership  
 – St. Anthony  
 Coca-Cola Bottling Company  
 – Calgary  
 – Toronto  
 Cold Springs Farm Limited – Thamesford  
 Connors Bros. – Blacks Harbour  
 Continental Mushroom  
 Corporation (1989) Ltd. – Metcalfe  
 Coopérative fédérée de Québec – Joliette  
 Cuddy Food Products – London  
 Dairytown Products Ltd. – Sussex  
 Diageo Canada Inc. – Gimli  
 Domric International Ltd. – Ruthven  
 Don Chapman Farms Ltd./Lakeview  
 Vegetable Processing Inc. – Queensville  
 Dykstra Greenhouses – St. Catharines  
 E.D. Smith and Sons LP – Seaforth  
 Effem Inc.  
 – Bolton  
 – Newmarket  
 Exceldor Coopérative Avicole – St-Anselme  
 Export Packers Foods Limited – Paris  
 Family Muffins & Desserts Inc. – Sherwood Park  
 Family Tradition Foods (Tecumseh) Inc.  
 – Tecumseh  
 Fancy Pokket Corporation – Moncton  
 Federated Co-operatives Limited – Saskatoon  
 Ferme Daichemin s.e.n.c  
 – St-Damase  
 – St-Pie  
 Ferme Gilles et Francine Lahaie enr.  
 – St-Michel-de-Napierreville  
 Ferme La Rouquine Inc. – Chicoutimi  
 Fernlea Flowers Limited – Delhi  
 Fleischmann's Yeast – Calgary  
 Flora Park Inc. – Sherrington



- Frito Lay Canada  
 – Cambridge  
 – Lethbridge  
 – Lévis  
 – Mississauga  
 – New Minas  
 – Pointe-Claire  
 – Taber  
 Funster Natural Foods Inc. – London  
 Furlani's Food Corporation – Mississauga  
 G.E. Barbour Inc. – Sussex  
 Ganong Bros. Limited – St. Stephen  
 Gencor Foods Inc. – Kitchener  
 General Mills Canada Corporation – Midland  
 Greenfield Gardens (Niagara) Inc. – Fenwick  
 Greenwood Mushroom Farm – Ashburn  
 Griffith Laboratories Ltd. – Toronto  
 H.J. Heinz Company of Canada Ltd.  
 – Leamington  
 Heritage Frozen Foods Ltd. – Alberta  
 Hershey Canada Inc.  
 Hillside Hothouse Ltd. – Ruthven  
 Hiram Walker & Sons Limited  
 Homeland Grain Inc. – Burgessville  
 HSF Foods Ltd. – Centreville  
 Hubberts Industries – Brampton  
 Humpty Dumpty Snack Foods Inc. – Summerside  
 Ice River Springs Water Co. Inc. – Feversham  
 Icewater Seafoods Inc. – Arnold's Cove  
 Inovata Foods Corp. – Edmonton  
 Jadee Meat Products Ltd. – Beamsville  
 Kerry Québec Inc. – Sainte-Claire  
 Kraft Canada Inc.  
 – East York  
 – Ville Mont-Royal  
 – East York Bakery – Toronto  
 Kuyvenhoven Greenhouses Inc.  
 – Brampton  
 – Halton Hills  
 La Rocca Creative Cakes – Thornhill  
 Laprise Farms Ltd. – Pain Court  
 Lassonde Beverages Canada – Toronto  
 Leahy Orchards Inc.  
 – Franklin  
 – Saint-Antoine Abbé  
 Legacy Cold Storage Ltd. – Chilliwack  
 Legal Alfalfa Products Ltd. – Legal  
 Les Aliments Dainty Foods – Windsor  
 Les Aliments Dare Limitée – Sainte-Martine  
 Les Distilleries Schenley Inc. – Valleyfield  
 Les Jardiniers du chef – Blainville  
 Les Luzernes Belcan du Lac St-Jean Inc.  
 – Hébertville Station  
 Les Oeufs-Bec-O Inc. – Upton  
 Les Productions Horticoles Demers Inc.  
 – Saint-Nicolas  
 Les produits Zinda Canada Inc. – Candiac  
 Les Serres Daniel Lemieux Inc. – Saint-Rémi  
 Les Serres Florinove – St-Paulin  
 Les Serres Gola – Mont St-Grégoire  
 Les Serres Granby Inc. – Granby  
 Les Serres Maedler (1989) Inc. – Nyon  
 Les Serres R. Bergeron Inc. – St-Apollinaire  
 Les Serres Riel Inc. – St-Rémi  
 Les Serres Sagami (2000) Inc. – Chicoutimi  
 Les Serres Nouvelles Cultures Inc.  
 – Sainte-Sophie  
 Les Serres Serge Dupuis – St-Élie-de-Caxton  
 Les Serres St-Benoît-du-Lac Inc. – Austin  
 Lilydale Cooperative Ltd. – Edmonton  
 Lucerne Foods – Calgary  
 Lyo-San Inc. – Lachute  
 Madelimer Inc. – Grande-Entrée  
 Maison des Futailles – St-Hyacinthe  
 Maple Leaf Foods Inc.  
 – Canada Bread Company Ltd.  
 – Multi-Marques Inc. – Laval  
 – Garden Province Meats Inc.  
 – Hub Meats – Moncton  
 – Landmark Feed Inc.  
 – Larsen Packers Limited  
 – Maple Leaf Consumer Foods  
 – Maple Leaf Fresh Foods  
 – Maple Leaf Poultry  
 – Rothsay  
 – Shur-Gain  
 Maple Lodge Farms Ltd. – Norval  
 Marsan Foods Limited – Toronto  
 Mastronardi Estate Winery – Kingsville  
 McCain Foods (Canada) – Calgary  
 Menu Foods – Streetsville  
 Midwest Food Products Inc. – Carberry  
 Minor Bros. Farm Supply Ltd. – Dunnville  
 Mitchell's Gourmet Foods Inc. – Saskatoon  
 Montréal Pita Inc. – Montréal  
 Mother Parkers Tea & Coffee Inc.  
 – Ajax  
 – Mississauga  
 Nadau Poultry Farm Ltd.  
 – St-François-de-Madawaska  
 NESCO Meats Inc. – Melfort  
 Nestlé Canada Inc. – London  
 Nestlé Purina PetCare – Mississauga  
 Norman Jobin Farms – Maidstone  
 Northern Alberta Processing Co. – Edmonton  
 Northumberland Co-operative Limited  
 – Miramichi  
 Nunavut Development Corporation  
 – Rankin Inlet  
 Oakrun Farm Bakery Ltd. – Ancaster  
 Ocean Legacy – L'Étang  
 Ocean Nutrition Canada Ltd. – Dartmouth  
 Okanagan North Growers Cooperative  
 – Winfield  
 Olymel – Red Deer  
 Omstead Foods Limited – Wheatley  
 OrangeLine Farms Limited – Leamington  
 Otter Valley Foods Inc. – Tillsonburg  
 Oxford Frozen Foods Limited – Oxford  
 Palmerston Grain – Palmerston  
 Pelee Hydroponics – Leamington  
 Pepe's Mexican Foods Inc. – Etobicoke  
 Pepsi-Cola Canada Beverages – Mississauga  
 PepsiCo Foods of Canada Inc.  
 – Peterborough  
 – Trenton  
 Pernod Ricard Canada – Windsor  
 Poinsettia Plantation (The) – Bothwell  
 Prairie Mushrooms (1992) Ltd. – Sherwood Park  
 Principality Foods Ltd. – Edmonton  
 Pyramid Farms Ltd. – Leamington  
 Quality Fast Foods – Edmonton  
 Quark Farms Ltd. – Mossbank  
 Regal Greenhouses Inc. – Virgil  
 Rekker Gardens Ltd. – Bowmanville  
 Rich Products of Canada Limited – Port Erie  
 Rol-land Farms Limited – Campbellville  
 Rosa Flora Limited – Dunnville  
 Sakai Spice (Canada) Corporation – Lethbridge  
 Saputo Foods Limited – Brampton  
 S.C.A. de L'Île-aux-Grues – L'Île-aux-Grues  
 Schneider Foods  
 – Ayr  
 – Kitchener  
 – Mississauga  
 – Port Perry  
 – Toronto  
 Sepallo Operations LP – Barrhead  
 Sepp's Gourmet Foods Ltd.  
 – Delta  
 – Richmond Hill  
 Sifto Canada Corp. – Goderich  
 Soil Less Growing Systems Inc. – Calgary  
 St. David's Hydroponics  
 – Niagara-on-the-Lake  
 – Beamsville  
 – St. Davids  
 Stag's Hollow Winery and Vineyard Ltd.  
 – Okanagan Falls  
 Stratus Vineyards Limited  
 – Niagara-on-the-Lake  
 Streef Produce Ltd. – Princeton  
 Sucre Lantic Limitée – Montréal  
 Sun Valley Foods Canada – London  
 Sunny Crunch Foods Ltd. – Markham  
 Sunrise Bakery Ltd. – Edmonton  
 Sunrise Farms Limited – Kingsville  
 Sun-Rype Products Ltd. – Kelowna  
 SunSelect Produce (Delta) Inc. – Aldergrove  
 Sunshine Peaks – Leamington  
 Sunterra Meats Ltd. – Innisfail  
 Sunwold Farms Ltd. – Acme  
 – Largie Farm – Dutton  
 – Peterborough Farm – Indian River  
 Supraliment s.e.c. – Trois-Rivières  
 SYSCO Food Services of Calgary  
 – Kelowna  
 – Toronto  
 Target Marine Products Ltd. – Sechelt  
 Thomson Meats Ltd. – Melfort  
 Townline/Processing Ltd. – Wellington  
 Transfeeder Inc. – Olds  
 Trochu Meat Processors – Trochu

Trophy Foods Inc. – Calgary  
 Unifed & Premix – Lethbridge  
 Unilever Canada  
 – Rexdale  
 – Brampton  
 Van Geest Bros. Limited – Grimsby  
 Vandermeer Nursery Ltd. – Ajax  
 Versacold Corporation – Vancouver  
 Viandes Kamouraska Inc. – St-Pascal  
 Vincor International Inc. – Niagara Falls  
 Vitoeuf Inc. – St-Hyacinthe  
 Voogt Greenhouses Inc. – Niagara-on-the-Lake  
 Voortman Cookies Ltd. – Burlington  
 W.J. O'Neil & Sons Ltd. – Maidstone  
 W. Martens Greenhouses Inc. – Leamington  
 Waldan Gardens – Wainfleet  
 Westglen Milling Ltd. – Barrhead  
 Weston Foods Inc. – Etobicoke  
 Weston Bakeries Limited  
 – Toronto  
 – Kingston  
 – Kitchener  
 – Orillia  
 – Ottawa  
 – Sudbury  
 – Winnipeg  
 Bronson Bakery Limited – Ottawa  
 Crissa Bakery – Barrie  
 Golden Mill Bakery – Hamilton  
 Pete's Mexican Foods Inc. – Etobicoke  
 Sir Bagel  
 Weston Fruit Cake Co.  
 Ready Bake Foods Inc.  
 Maplehurst Bakeries Inc. – Brampton  
 Willow Spring Hydroponics – Bothwell  
 Willy's Greenhouses Ltd. – Niagara-on-the-Lake  
 Willy Haec et Fils Inc. – St-Rémi

## Foundry

Ancast Industries Ltd. – Winnipeg  
 Bibby-Ste-Croix – Sainte-Croix  
 Breyer Casting Technologies Inc. – Brampton  
 Century Pacific Foundry Ltd. – Surrey  
 Crowe Foundry Limited – Cambridge  
 Deloro Stellite Inc. – Belleville  
 Elkem Métal Canada Inc. – Chicoutimi  
 ESCO Limited  
 – Port Coquitlam  
 – Port Hope  
 Gamma Foundries Limited – Richmond Hill  
 Grenville Castings Limited  
 – Merrickville  
 – Perth  
 – Smith Falls  
 M.A. Steel Foundry Ltd. – Calgary  
 Magotteaux Ltée – Magog  
 Mueller Canada – St-Jérôme  
 Norcast Castings Company Ltd. – Mont-Joli  
 Ramsden Industries Limited – London  
 Stackpole Limited – Mississauga  
 Supreme Tooling Group – Toronto

Unison Engine Components – Orillia  
 Vehcom Manufacturing – Guelph  
 Wabi Iron & Steel Corporation – New Liskeard  
 Welland Forge – Welland

## General Manufacturing

2527-4572 Québec Inc. (Les Serres Bergeron)  
 – Notre-Dame-du-Laus  
 – Notre-Dame-de-la-Salette  
 30852030 Québec Inc. (Serres Maryvon)  
 – L'Ascension  
 3M Canada Inc.  
 – London  
 – Brockville  
 – Etobicoke  
 – Morden  
 – Perth  
 A1 Label Inc. – Toronto  
 ABCO Industries Limited – Lunenburg  
 Aberfoyle Metal Treaters Ltd. – Guelph  
 Acuity Innovative Solutions – Richmond Hill  
 Acadian Platers Company Limited – Etobicoke  
 Accuride Canada Inc. – London  
 Active Burgess Mould & Design – Windsor  
 Advanced Ag and Industrial Ltd. – Biggar  
 Airex Industries Inc.  
 – Montréal  
 – Drummondville  
 Alcan Packaging Canada Limited – Weston  
 Aluminum Surface Technologies – Burlington  
 American Color Graphics Inc. – Stevensville  
 Anchor Lamina Inc.  
 – Cambridge  
 – Mississauga  
 – Windsor  
 Anchor Lamina Inc. – Reliance Fabrications  
 – Tilbury  
 Art Design International Inc. – Saint-Hubert  
 Armstrong World Industries Canada Ltd.  
 – Montréal  
 Artopex Plus Inc.  
 – Granby  
 – Laval  
 Arva Industries Inc. – St. Thomas  
 Associated Tube Industries – Markham  
 Automatic Coating Limited – Scarborough  
 BabCock & WilCox Canada Ltd. – Cambridge  
 Baron Metal Industries Inc. – Woodbridge  
 BASF The Chemical Company – Georgetown  
 Batteries Power (Iberville) Ltée  
 – St-Jean-sur-Richelieu  
 B.C. Instruments  
 – Schomberg  
 – Barrie  
 Bentofix Technologies Inc. – Barrie  
 Bernard Breton Inc. – St. Narcisse-de-Beaurivage  
 Best Color Press Limited – Vancouver  
 Blount Canada Ltd. – Guelph  
 Borden Cold Storage Limited – Kitchener  
 Bourgault Industries Ltd. – St. Brieux  
 Braam's Custom Cabinets – St. Thomas

Building Products of Canada Corp.  
 – Ville LaSalle  
 – Edmonton  
 – Pont-Rouge  
 Canada Mold Technology – Woodstock  
 CanCoil Thermal Corporation – Kingston  
 Canwood Furniture Inc. – Penticton  
 Carrière Union Ltée – Québec  
 Casavant Frères s.e.c. – St-Hyacinthe  
 CCL Container Aerosol Division  
 – Penetanguishene  
 Centre du Comptoir Sag-Lac Inc. – Alma  
 CertainTeed Gypsum Canada Inc. – Mississauga  
 Chandelles Tradition Ltée – Laval  
 ChromeShield Co. – Windsor  
 Climatizer Insulation Inc. – Etobicoke  
 CMP Advanced Mechanical  
 Solutions (Ottawa) Ltd.  
 CMP Mécaniques Avancée Ltée – Châteauguay  
 CNH Canada Ltd. – Saskatoon  
 Colourific Coatings Ltd. – Mississauga  
 Columbia Industries Limited – Sparwood  
 Comp-Tech Mfg. Inc. – Toronto  
 Conference Cup Ltd. – London  
 Control Skateboards Inc. – St-Nicolas  
 Cosella-Dorken Products Inc. – Beamsville  
 Coyle & Greer Awards Canada Ltd. – Mossley  
 Crown Metal Packaging Canada LP  
 – Concord  
 – Ville St-Laurent  
 CUMI Canada Inc. – Summerside  
 Davis Wire Industries Ltd. – Delta  
 Dawn Canadian Labels Inc. – Markham  
 Descor Industries Inc. – Markham  
 DEW Engineering and Development Limited  
 – Miramichi  
 – Ottawa  
 Dipaolo CNC Retrofit Ltd. – Mississauga  
 Dixie Electric Ltd. – Concord  
 Durable Release Coaters Limited – Brampton  
 Dura-Chrome Limited – Wallaceburg  
 EHC Global – Oshawa  
 EJC Mining Equipment Inc.  
 Eli Lilly Canada Inc.  
 Energizer Canada Inc. – Walkerton  
 Engauge Controls Inc. – Lakeshore  
 Enstel Manufacturing Inc. – Concord  
 Envirogard Products Ltd. – Richmond Hill  
 Ezeflow Inc. – Granby  
 Fabrication S Houle Inc.  
 – St-Germain-de-Grantham  
 Fantech Limited – Bouctouche  
 Fruits & Passion – Candiac  
 Futuretek-Bathurst Tool Inc. – Oakville  
 Garant – Saint-François  
 Garland Commercial Ranges Limited  
 – Mississauga  
 Garrtech Inc. – Stoney Creek  
 Garfoot Inc. – Montréal  
 George A. Wright & Son General Services Inc.  
 – Kingston

Georgia-Pacific Canada, Inc. – Thorold  
 Greif Bros. Canada Inc. – Stoney Creek  
 Groupe Altech 2003 Inc. – Pointe-Claire  
 Gunnar Manufacturing Inc. – Calgary  
 Hallink RSB Inc. – Cambridge  
 Hartmann Canada Inc. – Brantford  
 Henkel Canada Corporation,  
 Consumer Adhesives – Brampton  
 Hilroy, A Division of MeadWestvaCo  
 Canada LP – Toronto  
 Hitachi Canadian Industries Ltd. – Saskatoon  
 Hood Packaging Corporation – Calgary  
 Horst Welding Ltd. – Listowel  
 Hydroform Solutions – Brampton  
 Ibis Products Limited – Scarborough  
 Imaflex Inc. – Montréal  
 Imperial Tobacco Canada – Montréal  
 Imprimerie Interweb Inc. – Boucherville  
 Imprimeries TransContinental S.E.N.C.  
 – Boucherville  
 Indalex Limited – Port Coquitlam  
 Independent Mirror Industries Inc. – Toronto  
 Industrie Bodco Inc. – St-François-Xavier  
 Industries Graphiques Cameo Crafts Limitée  
 – Montréal  
 Integria Inc. – Saint-Laurent  
 Interface Flooring Systems (Canada) Inc.  
 – Belleville  
 J. A. Wilson Display Ltd. – Mississauga  
 Jay Ge Electroplaters Ltd. – Laval  
 John Gavel Custom Manufacturing Ltd. – Emo  
 JTI-Macdonald Corp. – Montréal  
 JTL Integrated Machine Ltd. – Port Colborne  
 Juliana Manufacturing Ltd. – Winnipeg  
 KelCoatings Limited – London  
 KI Pembroke LP – Pembroke  
 KIK Custom Products – Etobicoke  
 Kindred Industries – Midland  
 Kobay Tool & Stampings Inc. – Scarborough  
 Korex Canada ULC – Toronto  
 Korex Canada Don Valley ULC – Don Valley  
 Kwalty Labels Inc. – Richmond Hill  
 KWH Pipe (Canada) Ltd.  
 – Huntsville  
 – Saskatoon  
 La Compagnie Américaine de Fer  
 et Métaux Inc. – Montréal  
 Larsen & D'AmiCo Manufacturing Ltd.  
 – Edmonton  
 Lee Valley Tools Ltd.  
 – Ottawa  
 – Carp  
 Les Distributions Option Kit Inc. – Québec  
 Les Emballages Knowlton Inc. – Knowlton  
 Les industries Peintek Inc. – Chesterville  
 Les Production Ranger (1988) Inc. – Granby  
 Les Technologies Fibrox Ltée – Thetford Mines  
 L'Oréal Canada Inc. – Ville St-Laurent  
 Maclean Engineering & Marketing Co. Limited  
 – Collingwood  
 Magnum Signs Inc. – Chatham-Kent

Maksteel Service Centre – Mississauga  
 Manufacturier TechCraft Inc. – Laval  
 Marcel Depratto Inc. – Saint-Louis-de-Richelieu  
 Maritime Geothermal Ltd. – Petitcodiac  
 Matériaux Spécialisés Louiseville Inc. – Louiseville  
 Maverick Canada Limited – Wallaceburg  
 McCloskey International Limited – Peterborough  
 MeadWestvaCo Packaging Systems LP  
 – Ajax  
 – Pickering  
 – Toronto  
 Metex Heat Treating Ltd. – Brampton  
 Metro Label Company Ltd. – Toronto  
 Metro Label Pacific Ltd. – Langley  
 Métro-Jonerigin Inc. – St-Hubert  
 Metroland Printing, Publishing & Distributing  
 – Mississauga  
 Meuble Idéal Ltée – Saint-Charles-de-Bellechase  
 Meubles Canadel Inc. – Louiseville  
 Miralis Inc. – St-Anaclet-de-Lessard  
 MLT International Inc. – St-Pie  
 Mobilier MEQ Ltée – La Durantaye  
 Momentum – Newmarket  
 Mondo America Inc. – Laval  
 Montebello Packaging – Hawkesbury  
 Multy Industries Inc. – North York  
 Nexans Canada Inc. – Montréal East  
 Nord Gear Limited – Brampton  
 North American Decal – Markham  
 Norwest Precision Limited – Weston  
 Nutech Brands Inc. – London  
 Oberthur Jeux et Technologies Inc. – Montréal  
 OCM Manufacturing – Ottawa  
 O-I Canada Corporation – Montréal  
 Olympic Tool & Die Inc. – Mississauga  
 Orica Canada Inc. – Brownsburg  
 Owens Corning Canada Inc.  
 – Candiac  
 – Toronto  
 Padinox Incorporated  
 – Charlottetown  
 – Winsloe  
 Paisley Brick & Tile Co. Ltd. – Paisley  
 Patt Technologies Inc. – Saint-Eustache  
 Pavage U.C.P. Inc. – Charlesbourg  
 Pavex Ltée – Jonquière  
 Piddi Design Associates Limited – Mississauga  
 Pinnacle Finishing – Chatham  
 Pinnacle Mold Inc. – Tecumseh  
 Placage Chromex – Sainte-Foy  
 PolyCote Inc. – Concord  
 Polytainers Inc. – Toronto  
 Pomatek – Delson  
 PowerComm Inc.  
 – Edmonton  
 – Grande Prairie  
 – Hardisty  
 – Lloydminster  
 – Nisku  
 – Olds  
 – Prevost

Prémoulé Countertops  
 – Saint-Augustin-de-Desmaures  
 Prestige Glass International – Elliot Lake  
 PRO-ECO Limited – Oakville  
 Procter & Gamble Inc.  
 – Belleville  
 – Brockville  
 Prysman Systèmes et Câbles  
 – Saint-Jean-sur-Richelieu  
 Quebecor World Islington – Etobicoke  
 Quick Build Technologies – Sherwood Park  
 Resco Canada Inc. – Grenville-sur-la-Rouge  
 RLD Industries Ltd. – Ottawa  
 Rothmans, Benson & Hedges Inc. – North York  
 Royal Machine Manufacturing Co. – Woodbridge  
 Royal Window Coverings (Canada) Inc  
 – Boisbriand  
 Royalbond Co. – Woodbridge  
 Russel Metals Inc.  
 – Burlington  
 – Calgary  
 S.C. Johnson and Son, Limited – Brantford  
 Saint-Gobain Ceramic Materials Canada Inc  
 – Niagara Falls  
 Samuel Strapping Systems – Scarborough  
 Sandvik Materials Technology Canada  
 – Arnprior  
 Sandvik Tamrock Canada Inc. – Lively  
 Sani Métal Ltée – Québec  
 Scapa Tapes North America – Renfrew  
 Shorewood Packaging Corp.  
 – Brockville  
 – Scarborough  
 Siemens Milltronics Process Instruments Inc  
 – Peterborough  
 Simmons Canada Inc. – Brampton  
 Snap-on Tools of Canada Ltd. – Newmarket  
 Société Laurentide Inc. – Shawinigan  
 Soprema Inc. – Drummondville  
 Specialty Porcelain Products Limited – Burlington  
 SportsPal Products – North Bay  
 Stanley Canada Corporation – Smith Falls  
 Steelcase Canada Ltd. – Markham  
 Stepan Canada Inc. – Longford Mills  
 Stowe Woodward/Mount Hope Inc.  
 – Sherbrooke  
 Suntech Heat Treating Ltd. – Brampton  
 Superior Radiant Products Ltd. – Stoney Creek  
 Surrette Battery Company Limited – Springhill  
 Techform Products Limited – Penetanguishene  
 Teknion Furniture Systems – Toronto  
 Teknion Roy & Breton Inc. – St-Romuald  
 RBLogistik – St-Romuald  
 RBTek – St-Romuald  
 Roy & Breton – St-Vallier  
 Teknion Concept – Lévis  
 Teknion Québec – Montmagny  
 The Data Group of Companies  
 – Brampton  
 – Drummondville  
 Tri-Graphic Printing (Ottawa) Ltd. – Ottawa



ThermetCo Inc. – Montréal  
 TransContinental Interweb – Toronto  
     TransContinental Gagné – Louiseville  
     Trancontinental RBW Graphics – Owen Sound  
 Truefoam Limited – Dartmouth  
 Tube-Fab Ltd.  
     – Mississauga  
     – Charlottetown  
 Ultramet Industries Inc. – Breslau  
 Uni-Fab – Oldcastle  
 Unifiller Systems Inc. – Delta  
 Unique Tool & Gauge Inc. – Windsor  
 Unitrak Corporation Limited – Port Hope  
 USNR – Plessisville  
 VA TECH Ferranti-Packard Transformers Ltd.  
     – Hamilton  
 Van Wyck Packaging Ltd. – Owen Sound  
 Vannatter Group Inc. – Wallaceburg  
 Velcro Canada Inc. – Brampton  
 V.N. Custom Metal Inc. – North York  
 VicWest Steel – Oakville  
 Wabash Alloys Mississauga – Mississauga  
 Web Offset Publications Limited – Pickering  
 Welsh Industrial Manufacturing Inc.  
     – Stoney Creek  
 Wescam Inc. – Burlington  
 Wheeltronic Ltd. – Mississauga  
 Whitemud Iron Works – Edmonton  
 Windham Harvest Specialties Limited – Simcoe  
 Woodman Machine Products Ltd. – Kingston  
 Wyeth-Ayerst Canada Inc. – St-Laurent  
 ZENON Environmental Inc. – Oakville

## Lime

Carmeuse Beachville (Canada) Limited  
     – Blind River  
 Carmeuse Lime (Canada) Limited  
     – Dundas  
     – Ingersoll  
 Chemical Lime Company of Canada Inc.  
     – Langley  
 Graymont (NB) Inc. – Havelock  
 Graymont (QC) Inc. – Bedford  
 Graymont Western Canada Inc. – Calgary

## Mining

Barrick Gold Corporation – Rouyn-Noranda  
 BHP Billiton Diamonds Inc. – Yellowknife  
 Canadian Salt Company Limited (The) – Pugwash  
 De Beers Canada Inc.  
     – Toronto  
     – Yellowknife  
     – Timmins  
 Douglas Barwick Inc. – Brockville  
 Echo Bay Mines Ltd. – Edmonton  
 Foseco Canada Inc. – Guelph  
 Hillsborough Resources Limited  
     – Campbell River  
 Iron Ore Company of Canada – Labrador  
 Johnson Matthey Limited – Brampton

Les Tourbières Berger Ltée – Saint-Modeste  
 Luzenac Incorporated – Timmins  
 P. Baillargeon Ltée – Saint-Jean-sur-Richelieu  
 Sifto Canada Inc.  
     Goderich Underground Mining Facility  
     Unity  
 Teck Cominco Limited  
     – Toronto  
     – Trail  
 Williams Operating Corporation – Marathon  
 Vale Inco  
     – Toronto  
     – Copper Cliff  
     – Mississauga  
     – Port Colborne  
     – Thompson  
 Xstrata Canada Corporation – Toronto  
 Xstrata Coal Canada Donkin – Glace Bay  
 Xstrata Copper Canada  
     CCR – Montréal  
     Kidd Creek – Timmins  
     Horne – Rouyn-Noranda  
 Xstrata Nickel Canada  
     Sudbury Operations – Falconbridge  
     Fraser Morgan – Sudbury  
     Fraser Mine – Sudbury  
     Montcalm – Timmins  
     Nickel Rim – Sudbury  
     Raglan – Nunavik Territory  
     Sudbury Mines – Sudbury  
 Xstrata Zinc Canada  
     Brunswick Mine – Bathurst  
     Brunswick Smelter – Belledune  
     Fonderie Général – Lachine  
     Noranda-Matagami – Matagami  
     CEZ Refinery

## Oil Sands

Suncor Energy Inc. – Suncor Group  
 Syncrude Canada Ltd. (Oil Sands)

## Petroleum Products

Bitumar Inc.  
     – Hamilton  
     – Montréal  
 Canadian Tire Petroleum – Toronto  
 Chevron Canada Resources  
     – Vancouver  
     – Burnaby  
     – Calgary  
 Husky Energy Inc. – Calgary  
 Imperial Oil Limited – Calgary  
 Irving Oil Limited – Loch Lomond, Saint John  
 Parkland Refining Ltd. – Bowden  
 Petro-Canada – Oakville  
 Pound-Maker Agventures Ltd. – Lanigan  
 Rider Resources Ltd. – Calgary  
 Safety-Kleen Canada Inc. – Breslau  
 Shell Canada Limited – Calgary  
 Ultramar Ltd. – Montréal

## Plastics

A. Schulman Canada Ltd. – St. Thomas  
 ABC Group Inc. – Toronto  
 ABC Air Management Systems Inc.  
     – Rexdale  
     – Ronson  
 ABC Flexible Engineered Product Inc.  
     – Etobicoke  
 ABC Plastic Moulding  
     – Brydon  
     – Orlando  
 MSB Plastics Inc. – Etobicoke  
 PDI Plastics Inc. – Etobicoke  
 Polybottle Group Limited  
     – Edmonton  
     – Vancouver  
 Salflex Polymers Ltd. – Weston  
 Salga Associates – Concord  
 ADS Group Composites Inc. – Thetford Mines  
 Advanced Panel Products Ltd. – Nisku  
 AMCOR PET Packaging – Moncton  
 American Biltrite (Canada) Ltée – Sherbrooke  
 Amhil Enterprises – Burlington  
 Armstrong World Industries Canada Ltd.  
     – Montréal  
 Atlantic Packaging Products Ltd.  
 BainUltra Inc. – Saint-Nicolas  
 Blue Falls Manufacturing Ltd.  
     – Coleman  
     – Thorsby  
 Camoplast Inc. – Richmond  
 Canplas Industries Ltd. – Barrie  
 Clorox Company of Canada Ltd. (The)  
     – Brampton  
     – Orangeville  
 D & V Plastics Inc.  
 DDM Plastics  
 Domfoam International Inc. – Saint-Léonard  
 Downeast Plastics Ltd. – Cap-Pelé  
 DynaPlas Ltd. – Scarborough  
 Emballage St-Jean Ltée  
     – Saint-Jean-sur-Richelieu  
 Emballages Poliplastic Inc. – Granby  
 Fabrene Inc. – North Bay  
 Fenplast – Delson  
 Flexahopper Plastics Ltd. – Lethbridge  
 Formica Canada Inc. – St-Jean-sur-Richelieu  
 FRP Systems Ltd. – Thunder Bay  
 GSW Building Products – Barrie  
 Horizon Plastics Company Ltd. – Cobourg  
 Husky Injection Molding Systems Ltd. – Bolton  
 Hymopack Ltd. – Etobicoke  
 Injection Technologies Inc. – Windsor  
 IPEX Inc.  
     – Invader  
     – Langley  
     – London  
     – Mississauga  
     – Saint-Jacques-de-Montcalm  
     – Saint-Joseph-de-Beauce

Jokey Plastics North America Inc. – Goderich  
 Kord Products Inc. – Brampton  
 Lefko Produits de Plastiques Inc. – Magog  
 Les industries de moulage Polymax – Granby  
 Matrix Packaging Inc. – Mississauga  
 Mold-Masters Limited – Georgetown  
 Neocon International – Dartmouth  
 Newdon Industries Ltd. – Fergus  
 Newell Rubbermaid – Calgary  
 Nu-Co Plastics – Blenheim  
 Par-Pak Ltd. – Brampton  
 Plastiflex Canada Inc. – Orangeville  
 Plastiques GPR Inc. – St-Félix-de-Valois  
 Polybrite – Richmond Hill  
 Reid Canada Inc. – Mississauga  
 Richards Packaging Inc. – Etobicoke  
 Ropak Packaging  
 – Langley  
 – Oakville  
 – Springhill  
 Royal Group Technologies Limited – Woodbridge  
 Candor Plastics Co. – Woodbridge  
 Crown Plastics Extrusions Co. – Woodbridge  
 Dominion Plastics Co. – Woodbridge  
 Dynast Plastics Co. – Winnipeg  
 Gracious Living Industries – Woodbridge  
 Imperial Plastics Co. – Woodbridge  
 Industrial Plastics – Saint-Hubert  
 Le-Ron Plastics Inc. – Surrey  
 Majestic Plastics Co. – Woodbridge  
 Montreal PVC – St-Laurent  
 Prince Plastics Co. – Woodbridge  
 Reagens Canada Ltd. – Bradford  
 Regal Plastics Co. – Woodbridge  
 Residential Building Products –  
 St-Lambert-de-Lauzon  
 Royal Dynamics Co. – Woodbridge  
 Royal ECoProducts Co. – Concord  
 Royal Flex-Lox Pipe Limited – Abbotsford  
 Royal Foam Co. – Woodbridge  
 Royal Group Resources Co. – Woodbridge  
 Royal Outdoor Products Co. – Woodbridge  
 Royal Pipe Co. – Woodbridge  
 Royal Plastics Co. – ConCord  
 Royal Polymers Limited – Sarnia  
 Roytec Vinyl – Woodbridge  
 Thermoplast – Laval  
 Ultimate Plastics Co. – Woodbridge  
 SABIC Innovative Plastics – Long Sault  
 Silgan Plastics Canada Inc. – Mississauga  
 Ventra Group Co. – Calgary  
 Ventra Plastics Kitchener – Kitchener  
 Ventra Plastics Peterborough – Peterborough  
 Ventra Plastics Windsor – Windsor  
 W. Ralston (Canada) Inc. – Brampton  
 Vaudreuil-Dorion  
 Winpak Portion Packaging Ltd. – Toronto

## Pulp and Paper

AbitibiBowater Inc.  
 – Montréal  
 Alma  
 – Amos  
 – Baie-Comeau  
 – Beaupré  
 – Brooklyn  
 – Bridgewater  
 – Clermont  
 – Dolbeau-Mistassini  
 – Fort Frances  
 – Girardville  
 – Grand Falls – Windsor  
 – Grand-Mère  
 – Iroquois Falls  
 – Jonquière  
 – Maniwaki  
 – Mistassini  
 – Price  
 – Saint-Félicien  
 – Saint-Raymond  
 – Thorold  
 Alberta-Pacific Forest Industries Inc. – Boyle  
 Atlantic Packaging Products Ltd.  
 – Agincourt  
 – Brampton  
 – Don Mills  
 – Ingersoll  
 – Mississauga  
 – Scarborough  
 – Whitby  
 British Confectionery Company Limited  
 – Mount Pearl  
 Cariboo Pulp and Paper Company Limited  
 – Quesnel  
 Caraustar Industrial & Consumer Products Group  
 – Kingston  
 Cascades Inc. – Kingsey Falls  
 Cascades Boxboard Group  
 – Montréal  
 – East Angus  
 – Jonquière  
 – Toronto  
 – Mississauga  
 Cascades Fine Paper Group  
 – Saint-Jérôme  
 – Breakeyville  
 Converting Center – Saint-Jérôme  
 Cascades Tissue Group  
 – Candiac  
 – Kingsey Falls  
 – Lachute  
 Cascades Speciality Products Group  
 – Kingsey Falls  
 Cascades Enviropac – Berthierville  
 Cascades Lupel – Cap-de-la-Madelaine  
 Cascades Inopak – Drummondville

Cascades Multi-Pro – Drummondville  
 Cascades East Angus – East Angus  
 Cascades Papier Kingsey Falls – Kingsey Falls  
 Cascades Conversion Inc. – Kingsey Falls  
 Daishowa-Marubeni International Ltd.  
 – Peace River  
 Domtar Inc.  
 – Montréal  
 – Dryden  
 – Espanola  
 – Lebel-sur-Quévillon  
 – Ottawa  
 – Terrebonne  
 – Windsor  
 Emballages Smurfit-Stone Canada Inc  
 – La Tuque  
 Smurfit-Stone – Pontiac  
 F.F. Soucy Inc. – Rivière-du-Loup  
 Interlake Papers – St. Catharines  
 Irving Forest Services Limited – Saint John  
 Irving Papers Inc. – Saint John  
 Irving Tissue Corporation – Dieppe  
 Irving Tissue Inc. – Dieppe  
 Jones Packaging Inc. – London  
 Kruger Inc. – Montréal  
 Lake Utopia Paper – Utopia  
 Les Cartons Northrich Inc. – Granby  
 Marathon Pulp Inc. – Marathon  
 Maritime Paper Products Limited – Dartmouth  
 Master Packaging Inc. – Dieppe  
 Neenah Paper Company of Canada  
 – Terrace Bay  
 NewPage Port Hawkesbury – Port Hawkesbury  
 Norampac Inc.  
 – St-Bruno  
 – Burnaby  
 – Cabano  
 – Calgary  
 – Drummondville  
 – Moncton  
 – Vaughan  
 Norampac Lithotech – Scarborough  
 Norampac Inc. OCD – Mississauga  
 Norampac Inc. SPB – Montréal  
 NorskeCanada – Campbell River  
 Paper Source Converting Mill Corp.  
 Papiers Scott Limitée  
 – Crabtree  
 – Gatineau  
 – Lennoxville  
 Papiers Stadacona – Québec  
 Peterboro Cardboards Limited – Peterborough  
 Pope & Talbot Ltd. – Nanaimo  
 Rosmar Litho Inc. – Baie D'Urfé  
 Sac Drummond Inc. – St-Germain-de-Grantham  
 Sonoco Canada Corporation – Trois-Rivières  
 St. Marys Paper Ltd. – Sault Ste. Marie  
 Tembec Inc. – Témiscaming  
 Tembec Industries Inc. – Chapeau  
 Tembec Paper Group – Spruce Falls Operations

#### Tolko Industries Ltd.

- Armstrong
- Heffley Creek
- High Level
- High Prairie
- Kelowna
- Lumby
- Meadow Lake
- Merritt
- Quesnel
- Slave Lake
- The Pas
- Vernon
- Williams Lake
- UPM-Kymmene Miramichi Inc. – Miramichi
- Weldwood of Canada Limited – Vancouver
- West Fraser Timber Co. Ltd.
- Eurocan Pulp and Paper Co. – Kitimat
- Hinton Pulp – Hinton
- Quesnel River Pulp Co. – Quesnel
- Slave Lake Pulp Corporation – Slave Lake
- Zellstoff Celgar Limited Partnership – Castlegar

#### Rubber

- AirBoss Rubber Compounding – Kitchener
- Brenntag Canada Inc. – Mississauga
- Compagnie Henry Canada, Inc. – Lachine
- Fuller Industrial Corporation – Lively
- GDX Canada Inc. – Welland
- Goodyear Canada Inc. – Nananee
- Hamilton Kent Canada Ltd. – Toronto
- Lanxess Inc. – Sarnia
- Michelin North America (Canada) Inc.
- New Glasgow
- NRI Industries Inc. – Toronto
- Soucy Techno Inc. – Forest Rock
- Technologies Veyance Canada Inc.
- Saint-Alphonse de Granby

#### Steel

- Abraham Steel & Services Ltd. – Woodbridge
- Algoma Steel Inc. – Sault Ste. Marie
- AltaSteel Ltd. – Edmonton
- ArcelorMittal Mines Canada – Hamilton
- ArcelorMittal Tubular Products – Woodstock
- Gerdau Ameristeel
- Cambridge
- Whitby
- Manitoba
- Infasco – Marieville
- Ivaco Rolling Mills LP – L'Orignal
- Laurel Steel – Burlington
- Mittal Canada Hamilton Inc. – Hamilton
- Mittal Canada Lachine Inc. – Lachine
- Namasco Limited – Calgary
- Nelson Steel
- Nanticoke
- Stoney Creek
- Ontario Chromium Plating Inc. – Oakville
- Peninsula Alloy Inc. – Stevensville
- QIT – Fer et Titane Inc. – Tracy
- Samuel Plates Sales – Stoney Creek
- Slater Steel Inc. – Hamilton Specialty Bar Division
- Spencer Steel Ltd. – Ilderton
- U.S. Steel Canada Inc.

#### Textiles

- Albany International Canada Inc. – Perth
- Albarrie Canada Limited – Barrie
- American & Efird Canada Inc. – Montréal
- Annabel Canada Inc. – Drummondville
- Avanti Apparel Inc. – Plessisville
- AYK Socks Inc. – Saint-Leonard
- Barrday Inc. – Cambridge
- Beaulieu Canada Inc. – Acton Vale
- Bennett Fleet (Quebec) Inc. – Ville Vanier
- Bridgeline Ropes Inc. – Deseronto
- C.S. Brooks Canada Inc. – Magog
- Cambridge Towel Corporation (The) – Cambridge
- Canadian General-Tower Limited – Cambridge
- Calko (Canada) Inc. – Montréal
- Cansew Inc. – Saint-Michel
- Collingwood Fabrics Inc. – Collingwood
- Colorama Dyeing and Finishing Inc.
- Hawkesbury
- Consoltex Inc. – Saint-Laurent
- Délavage National Inc. – Asbestos
- Dentex – Montréal
- Di-tech Inc. – Montréal
- Doubletex Inc. – Montréal
- Fibres Armtex Inc. – Magog
- Geo. Sheard Fabrics (1994) Ltd. – Coaticook
- Hafner Inc. – Sherbrooke
- J.L. de Ball Canada Inc. – Granby
- Jack Spratt Mfg Inc. – Montréal
- Kraus Carpet Mills Limited – Waterloo
- Lac-Mac Limited – London
- Lainages Victor Ltée – Saint-Victor
- Lanart Rug Inc. – Saint-Jean-sur-Richelieu
- Les Produits Belt-Tech Inc. – Granby
- Les Tricots Confort Absolu Inc. – Montréal
- Lincoln Fabrics Ltd. – St. Catharines
- Manufacturier de bas de nylon Doris Ltée
- Montréal
- Marimac Group (The)
- Montréal
- Iroquois
- Mondor Ltée – Saint-Jean-sur-Richelieu
- Montreal Woollens (Canada) Ltd. – Cambridge
- Morbern Inc. – Cornwall
- PGI-DIFCO Tissus Performance Inc. – Magog
- Prescott Finishing Inc. – Prescott
- Spinrite Inc. – Listowel
- St. Lawrence Corporation – Iroquois
- Stanfield's Limited – Truro
- Stedfast Inc. – Granby
- Strudex Fibres Limited – Waterloo
- Télio & Cie – Montréal
- Textiles Monterey (1996) Inc. – Drummondville
- Tri-Tex Co Inc. – Saint-Eustache

- Velcro Canada Inc. – Brampton
- Vitafoam Products Canada Ltd. – Downsview
- VOA Colfab Inc. – Collingwood
- Waterloo Textiles Limited – Cambridge

#### Transportation Equipment

- A.G. Simpson Automotive Inc.
- Cambridge
- Oshawa
- Scarborough
- ABC Group Inc. – Toronto
- ABC Air Management Systems Inc. (Multi-Flex)
- ABC Climate Control Systems Inc.
- ABC Flexible Engineered Products Inc. (Extrusion)
- ABC Group Exterior Systems
- ABC Group Interior Systems
- ABC Group Product Development
- ABC Metal Products Inc.
- LCF Manufacturing Ltd. – Rexdale
- LCF Manufacturing Ltd. – Weston
- Aalbers Tool & Mold Inc. – Oldcastle
- Alcoa Wheel Products Collingwood
- Collingwood
- Anton Mfg. – Concord
- ArvinMeritor Canada – Tilbury
- B&W Heat Treating Canada ULC – Kitchener
- Bombardier Aerospace – Downsview
- Bombardier Produits Récréatifs – Valcourt
- Bovern Enterprises Inc. – Markham
- Burlington Technologies Inc. – Burlington
- Cami Automotive Inc. – Ingersoll
- Chalmers Suspensions International Inc.
- Mississauga
- Chemin de fer Canadien Pacifique/Canadian Pacific Railway – Montréal
- Citerne Almac International Inc. – Lanoraie
- CSI Gear Corporation – Mississauga
- DaimlerChrysler Canada Inc.
- Dana Canada Corporation
- Brantford
- Burlington
- Cambridge
- Oakville
- Dortec Industries – Newmarket
- Dresden Industrial
- Rodney
- Stratford
- Dura-Lite Heat Transfer Products Ltd. – Calgary
- Edscha of Canada L.P. – Niagara Falls
- F & P Mfg., Inc. – Tottenham
- Faurecia Automotive Seating – Bradford
- Ford Motor Company of Canada, Limited
- Oakville
- St. Thomas
- Windsor
- Freightliner of Canada Ltd. – Sterling Trucks Division – St. Thomas



GATX Rail Canada  
 – Coteau-du-Lac  
 – Moose Jaw  
 – Red Deer  
 – Rivière-des-Prairies  
 – Sarnia  
 General Motors of Canada Limited  
 – Oshawa  
 – St. Catharines  
 – Windsor  
 Glueckler Metal Inc. – Barrie  
 Halla Climate Control Canada Inc. – Belleville  
 Héroux Devtek Inc.  
 – Longueuil  
 – Scarborough  
 Hitachi Construction Truck  
 Manufacturing Ltd. – Guelph  
 Honda of Canada Mfg. – Allison  
 Iafate Machine Works Ltd. – Thorold  
 International Truck and Engine  
 Corporation Canada – Chatham  
 Jefferson Elora Corporation (JEC) – Elora  
 Johnson Controls LP  
 – Lakeshore  
 – London  
 – Milton  
 – Mississauga  
 – Orangeville  
 – Tillsonburg  
 – Whitby  
 Lear Corporation – Mississauga  
 Leggett & Platt London – London  
 Schukra of North America – Lakeshore  
 Litens Automotive Partnership – Woodbridge  
 Mancor Canada Inc. – Oakville  
 Massiv-Die-Form – Brampton  
 Meritor Suspension Systems Company  
 – Chatham  
 – Milton  
 Métal Marquis Inc. – La Sarre  
 Modatek Systems – Milton  
 Montupet Ltée – Rivière-Beaudette  
 National Steel Car Limited – Hamilton  
 Nemak of Canada – Windsor  
 Neptunus Yachts Inc. – St. Catharines  
 Niagara Piston Inc. – Beamsville  
 Northstar Aerospace (Canada) Inc. – Milton  
 NTN Bearing Mfg. Canada – Mississauga  
 Oetiker Limited – Alliston  
 Omron Dualtec Automotive Electronics Inc. –  
 Oakville  
 Ontario Drive & Gear Limited – New Hamburg  
 Orenda Aerospace Corporation – Mississauga  
 Orion Bus Industries Inc. – Mississauga  
 Pilkington Glass of Canada – Collingwood  
 Platinum Tool Technologies Inc. – Oldcastle  
 Polywheels Manufacturing Ltd. – Oakville  
 Portec Produits Ferroviaires Ltée  
 – St-Jean-sur-Richelieu  
 Pratt & Whitney Canada Inc. – Longueuil

Presstran Industries – St. Thomas  
 Prévost Car Inc. – Ste-Claire  
 Prince Metal Products Ltd. – Windsor  
 Procor Limited  
 – Oakville  
 – Edmonton  
 – Joffre  
 – Regina  
 – Sarnia  
 Production Paint Stripping Ltd. – Toronto  
 R. Reininger & Son Limited – Newmarket  
 Remtec Inc. – Chambly  
 Rockwell Automation Canada Inc.  
 – Cambridge  
 – Stratford  
 Russel Metal Inc. – Mississauga  
 Siemens VDO Automotive Inc.  
 – Tilbury  
 – Windsor  
 Simcoe Parts Service Inc. – Alliston  
 Sonaca NMF Canada – Mirabel  
 Standard Aero Ltd. – Winnipeg  
 Sydney Coal Railway Inc. – Sydney  
 Tool-Plas Systems Inc. – Oldcastle  
 Total Cast Integrated Technologies – Concord  
 Toyota Motor Manufacturing Canada Inc.  
 – Cambridge  
 TRW Automotive  
 – St. Catharines  
 – Woodstock  
 TS Tech Canada Inc. – Newmarket  
 UBE Automotive North America – Sarnia  
 Unison Engine Components – Orillia  
 Ventra Group Co. – Calgary  
 Flex-n-Gate Bradford – Bradford  
 Flex-n-Gate Canada – Tecumseh  
 Flex-n-Gate Seeburn  
 – Beaverton  
 – Tottenham  
 Veltri Metal Products  
 – Glencoe  
 – Tecumseh  
 – Windsor  
 Ventra AFR – Ridgetown  
 Volvo Cars of Canada Ltd. – Toronto  
 Waterville TG Inc. – Waterville  
 Woodbridge Foam Corporation – Mississauga  
 ZF Heavy Duty Steering Inc. – St. Thomas

### Upstream Oil and Gas

AltaGas Services Inc. – Wabasca  
 Baytex Energy Ltd. – Taber  
 BP Canada Energy Company  
 – Calgary  
 – Edson  
 – Grande Prairie  
 – Rocky Mountain House  
 Chevron Canada Limited  
 – Vancouver  
 – Burnaby  
 – Calgary

Connacher Oil and Gas Limited – Calgary  
 ConocoPhillips Canada (North) Limited  
 – Calgary  
 – Deep Basin  
 – Wembley  
 – Rimbey/O'biese  
 – Southern Plains  
 – Big Valley  
 – Jenner  
 – Morrin  
 – Vulcan  
 – Kaybob/Edson  
 – Edson  
 – Northern Plains  
 – Foothills  
 – Mackenzie Delta  
 – Atlantic French Corridor  
 Crescent Point Energy Trust  
 – Provost  
 – Sounding Lake  
 Devon Canada Corporation  
 – Calgary  
 – Central  
 – Deep Basin  
 – Foothills  
 – Lloydminster  
 – Peace River  
 – Fairview  
 – Northern Plains  
 – Fort McMurray  
 – N.E. British Columbia/N.W. Alberta  
 – Fort St-John  
 Duke Energy Transmission Gas  
 – Calgary  
 – Chetwynd  
 – Fort Nelson  
 – Hope  
 – Mile 117  
 – Mile 126  
 – Pink Mountain  
 – Taylor  
 – Vancouver  
 EnCana Corporation – Calgary  
 Enbridge Pipelines Inc.  
 – Calgary  
 – Edmonton  
 Floating Pipeline Company (The)  
 – Halifax  
 – Saint John  
 Husky Oil Operations Ltd. – Rainbow Lake  
 Keyspan Energy Canada  
 – Rocky Mountain House  
 Newalta Corporation  
 – Abbotsford  
 – Airdrie  
 – Amelia  
 – Brooks  
 – Calgary  
 – Cranbrook  
 – Drayton Valley  
 – Drumheller

- Eckville
- Edmonton
- Elkpoint
- Fort St. John
- Gordondale
- Grande Prairie
- Halbrite
- Hays
- Hughenden
- Nisky
- Nilton Junction
- Nanaimo
- North Vancouver
- Pigeon Lake
- Prince George
- Raymond
- Red Earth
- Redwater
- Regina
- Richmond
- Sparwood
- Stauffer
- Stettler
- Surrey
- Taber
- Valleyview
- West Stoddart
- Willesden Green
- Winfield
- Zama
- Nexen Canada Ltd. – Calgary
- Northrock Resources Ltd.
- Calgary
- Niton Junction
- Paramount Resources Ltd. – Calgary
- Pengrowth Corporation – Calgary
- Penn West Petroleum Ltd. – Minnehik Buck Lake
- Talisman Energy Inc.
- Calgary
- Carlyle
- Chauvin, Alberta
- Chauvin, Saskatchewan
- Chetwynd
- Edson
- Grande Prairie
- Lac La Biche
- Shaunavon
- Turner Valley
- Warburg
- Windsor
- Taurus Exploration Ltd.
- Consort
- Veteran
- Trans World Oil & Gas Ltd. – Calgary

## Wood Products

Babine Forest Products Company – Burns Lake  
 Canfor Corporation – Vancouver

- Canadian Forest Products Ltd. – Bear Lake
- Canfor Pulp Limited Partnership
- Intercontinental – Prince George
- Northwood – Prince George
- Prince George – Prince George

Coldstream Lumber – Vernon  
 Columbia Forest Products – Saint-Casimir  
 Dava Inc. – Tring Junction  
 Domtar Inc.

- Big River
- Ear Falls
- Elk Lake
- Kamloops
- Lebel-sur-Quévillon
- Ostrom
- Matagami
- Nairn Centre
- Prince Albert
- Sainte-Marie
- Sault Ste. Marie
- Timmins
- Val-d'Or Sawmill
- Val-d'Or Sullivan Mill
- Waswanipi
- White River

Entreprises Interco Inc.

- Saint-Germain-de-Grantham

Erie Flooring and Wood Products – West Lorne  
 Finewood Flooring & Lumber Limited – Baddeck  
 Fiready Inc. – Clair  
 George Guenzler & Sons Inc. – Kitchener  
 Granules L.G. Inc. – St-Félicien  
 Groupe Savoie Inc. – St-Quentin  
 Harring Doors Ltd. – London  
 Industries Maibec Inc. – St-Pamphile  
 Interforest Ltd. – Durham  
 J.D. Irving, Limited

- Saint John
- Deersdale

K&C Silviculture Ltd.

- Red Deer
- Oliver

Loger Toys Ltd. – Brantford  
 Louisiana Pacific Canada Ltd. – East River  
 Madawaska Doors Inc. – Bolton  
 MacTara Limited – Upper Musquodoboit  
 Marcel Lauzon Inc. – East Hereford  
 MDF La Baie Inc. – La Baie  
 Norbord Industries Inc. – Toronto  
 North Atlantic Lumber Inc. – Glenwood  
 Palliser Lumber Sales Ltd. – Crossfield  
 Planchers Mercier Inc. – Montmagny

Poutres et Poteaux Val-Morin Inc.  
 – Sainte-Agathe-des-Monts  
 Rip-O-Bec Inc. – St-Apollinaire  
 Riverside Forest Products Limited – Armstrong  
 Roland Boulanger & Cie Itée. – Warwick  
 Scierie Girard Inc. – Shipshaw  
 Tembec Inc. – Témiscaming

- Tembec Industries Inc. – Chapleau
- Tembec Paper Group – Spruce Falls

West Fraser Timber Co. Ltd. – Vancouver  
 Alberta Plywood Ltd.

- Edmonton
- Slave Lake

Blue Ridge Lumber – Whitecourt  
 Chetwynd Forest Industries – Chetwynd  
 Fraser Lake Sawmills – Fraser Lake  
 Hinton Wood Products – Hinton  
 Houston Forest Products – Houston  
 Northstar Lumber – Quesnel  
 100 Mile Lumber – 100 Mile House  
 Pacific Inland Resources – Smithers  
 Quesnel Laminators – Quesnel  
 Quesnel Plywood – Quesnel  
 Quesnel Sawmill – Quesnel  
 Ranger Board – Whitecourt  
 Skeena Sawmills – Terrace  
 Sundre Forest Products Inc. – Sundre  
 West Fraser LVL – Rocky Mountain House  
 West Fraser Mills – Chasm Division

- 70 Mile House

West Fraser Mills Ltd. – Quesnel  
 West Fraser Timber – Williams Lake  
 WestPine MDF – Quesnel  
 Williams Lake Plywood – Williams Lake

# CIPEC Trade Associations

Aerospace Industries Association of Canada	Canadian Meat Council
Alberta Food Processors Association	Canadian Petroleum Products Institute
Aluminium Association of Canada	Canadian Plastics Industry Association
Atlantic Dairy Council	Canadian Steel Environmental Committee (Canadian Steel Producers Association)
Automotive Parts Manufacturers' Association	Canadian Textiles Institute
Baking Association of Canada	Canadian Vehicle Manufacturers' Association
Brewers Association of Canada	Cement Association of Canada
Canadian Association of Metal Finishers	Council of Forest Industries
Canadian Association of Petroleum Producers	Electro-Federation Canada
Canadian Chamber of Commerce	Fisheries Council of Canada
Canadian Chemical Producers' Association	Food and Consumer Products Manufacturers of Canada
Canadian Construction Association	Forest Engineering Research Institute of Canada
Canadian Council of Grocery Distributors	Forest Products Association of Canada
Canadian Electricity Association	Forintek Canada Corporation
Canadian Energy Pipeline Association	Mining Association of Canada
Canadian Fertilizer Institute	NAIMA Canada
Canadian Foundry Association	Ontario Agri Business Association
Canadian Gas Association	Ontario Food Processors Association
Canadian Healthcare Engineering Society	Packaging Association of Canada
Canadian Lime Institute	Québec Forest Industry Council
Canadian Manufacturers & Exporters	Rubber Association of Canada
Alberta Division	Small Explorers and Producers Association of Canada
British Columbia Division	Wine Council of Ontario
Manitoba Division	
New Brunswick Division	
Newfoundland Division	
Nova Scotia Division	
Ontario Division	
Prince Edward Island Division	



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# Glossary of Terms

## Annual Census of Mines

NRCan survey that collects information on NAICS 2122 (Metal Mining) and NAICS 2123 (Non-Metal Mineral Mining and Quarrying). Full name is Annual Census of Mines, Quarries and Sand Pits.

## Annual Survey of Manufactures (ASM)

Statistics Canada survey. Provides information on the consumption of purchased fuels and electricity (CPFE) for approximately 230 subsectors at the four-digit NAICS code levels.

## Base Year

A reference year. For the Framework Convention on Climate Change, 1997 is the base year.

## Carbon Dioxide (CO<sub>2</sub>)

A compound of carbon and oxygen that in its normal gaseous state is clear and colourless. CO<sub>2</sub> is formed when carbon-bearing fuels are burned. It can also be formed via other reactions that do not involve combustion.

## Carbon Dioxide Equivalent (CO<sub>2</sub>e)

A metric measure used to compare the emissions of the different GHGs based upon their global warming potential. Global warming potentials are used to convert GHGs to CO<sub>2</sub>e.

## Economic Energy Intensity

Energy consumption per unit of economic output.

## Embodied Energy

The energy consumed to transform all upstream raw materials into the final product; in a life-cycle approach, it would be the "cradle to grave" energy burden.

## Energy Intensity

Energy consumption per unit of output.

## Energy Intensity Indicator

A dimensionless ratio equal to the energy intensity in a particular year divided by the energy intensity of the base year. The energy intensity indicator for the base year equals 1.0.

## Energy Performance Measures

Any variety of metrics that would indicate an aspect of energy performance.

## Greenhouse Gas (GHG)

A GHG absorbs and radiates heat in the lower atmosphere that otherwise would be lost in space. The greenhouse effect is essential for life on this planet because it keeps average global temperatures high enough to support plant and animal growth. The main GHGs are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), chlorofluorocarbons (CFCs) and nitrous oxide (N<sub>2</sub>O). By far the most abundant GHG is CO<sub>2</sub>, accounting for 70 percent of the greenhouse effect.

## Gross Domestic Product (GDP)

The total value of goods and services produced by the nation's economy before deduction of depreciation charges and other allowances for capital consumption, labour and property located in Canada. It includes the total output of goods and services by private consumers and government, gross private domestic capital investment and net foreign trade. GDP figures are reported in real 1986 dollars.

## Higher Heating Value

The amount of heat that is obtained when a specified amount of fuel is combusted with its stoichiometrically correct amount of air, both being at 15°C before the heat release is measured (also called gross calorific value or gross heating value).

## Industrial Consumption of Energy (ICE) Survey

Statistics Canada survey on energy use. Covers purchased and non-purchased energy for approximately 24 industrial subsectors.

## Lower Heating Value

The higher heating value minus the latent heat of vaporization of the water vapour formed by the combustion of any hydrogen present in the fuel. For a fuel with no hydrogen, the higher and lower heating values are the same (also called lower calorific value or net heating value).

## Natural Resources Canada (NRCan)

The predominant natural resource department of the Government of Canada. NRCan has a mandate to promote the sustainable development and responsible use of Canada's mineral, energy and forestry resources and to develop an understanding of Canada's land mass.

## Nitrogen Dioxide (NO<sub>2</sub>)

One of a group of gases called nitrogen oxides, which are composed of nitrogen and oxygen. Like sulphur dioxide, nitrogen oxides can react with other chemicals in the atmosphere in the presence of sunlight to form acidic pollutants, including nitric acid.

## North American Industry Classification System (NAICS)

A classification system that categorizes establishments into groups with similar economic activities. The structure of the NAICS, adopted by Statistics Canada in 1997 to replace the 1980 Standard Industrial Classification (SIC) system, was developed by the statistical agencies of Canada, Mexico and the United States.

## Physical Energy Intensity

Energy consumption per unit of physical output.

## Quarterly Report on Energy Supply and Demand (QRES)

Provides an energy balance of all energy consumption in Canada. QRES data about the manufacturing industries are gathered principally by the Industrial Consumption of Energy (ICE) survey. These data are supplemented by other surveys about the disposition of energy (from utilities) and the production of petroleum products.

## Specific Energy Consumption

Energy consumption per physical unit of output (also called physical energy intensity).

## Standard Industrial Classification (SIC)

A classification system that categorizes establishments into groups with similar economic activities.

## Statistics Canada

Statistics Canada is the country's national statistics agency, with programs organized into three broad subject areas: demographic and social, socio-economic and economic. Under the *Statistics Act*, Statistics Canada is required to collect, compile, analyze, abstract and publish statistical information on virtually every aspect of the nation's society and economy. All information given to Statistics Canada through surveys, the census or any other source is confidential. Statistics Canada does not release any information that identifies an individual or organization.

## Sulphur Oxides (SO<sub>x</sub>)

A product of combustion of fuels that contain sulphur. Sulphur oxides are a major component of acid rain.



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Natural Resources Canada's Office of Energy Efficiency

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